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6.11.22

The Journal of the Department of Agriculture of Victoria, Australia.

October, 1922.

PRINCIPAL CONTENTS

Codlin Moth Experiments

Some Wine Defects

Weeds and Their Eradication

Control of Potato Moth Grub

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OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

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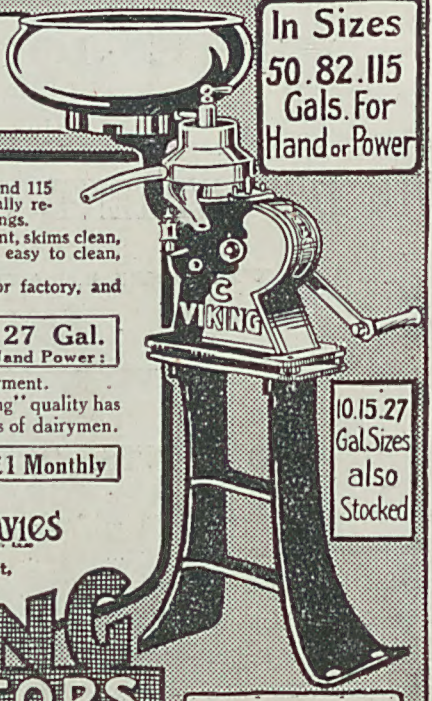

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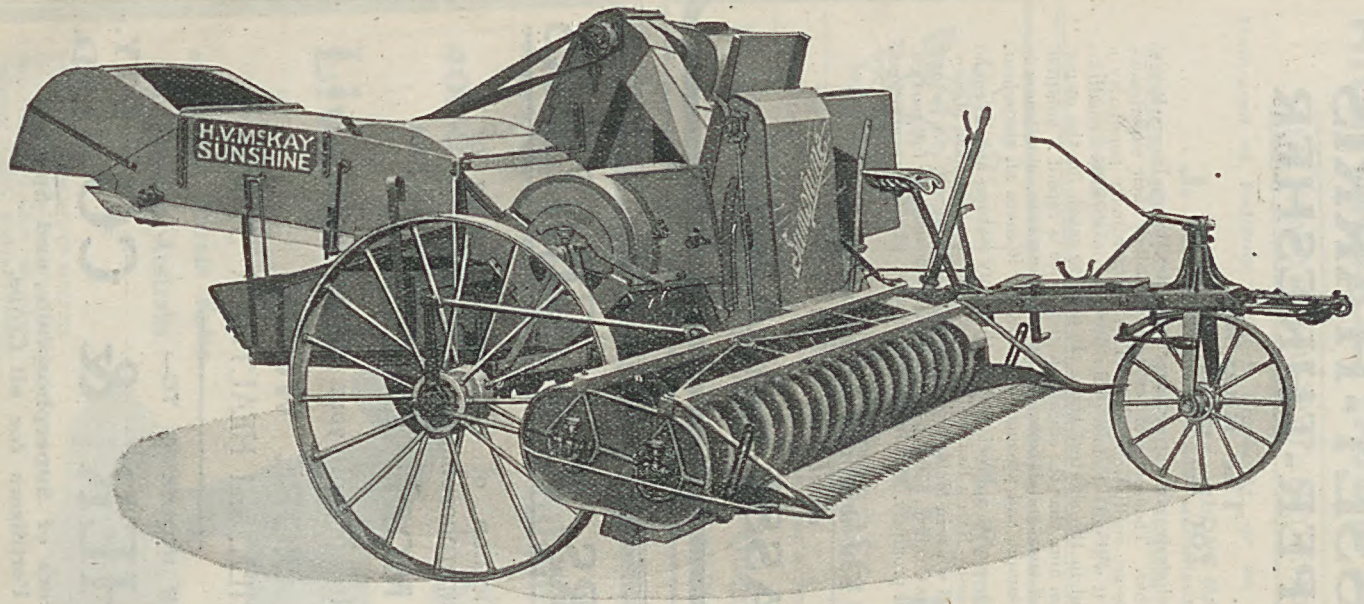

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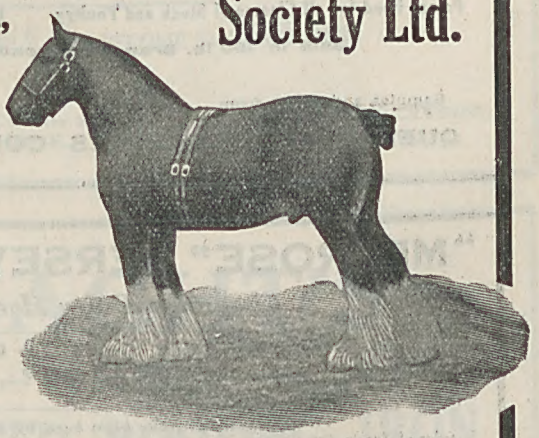

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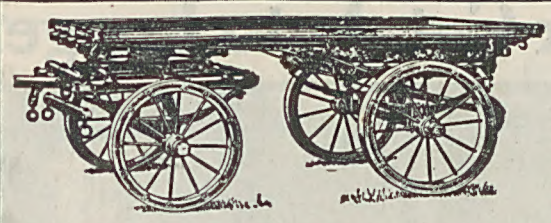

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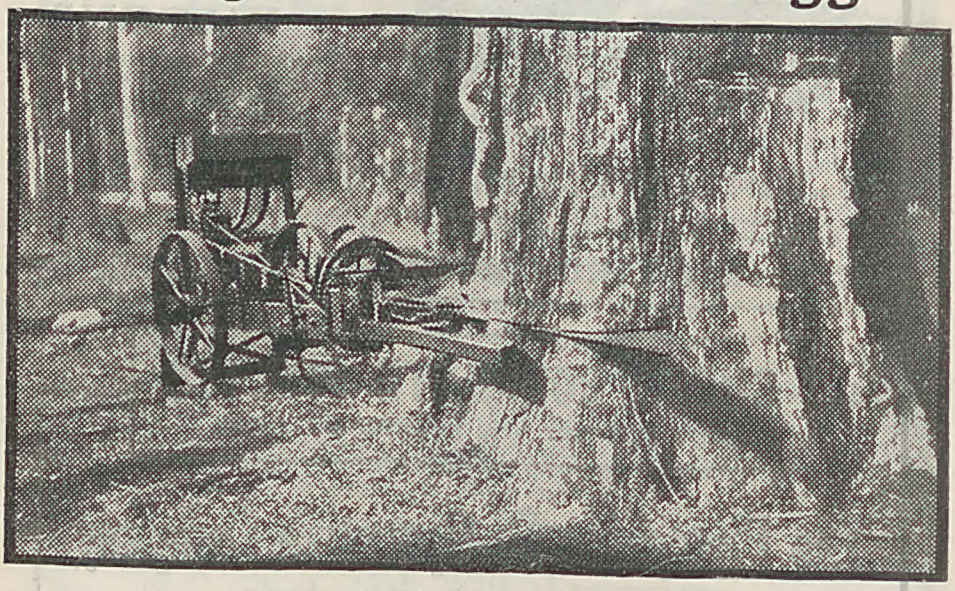

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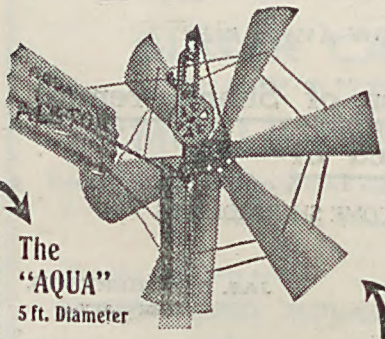

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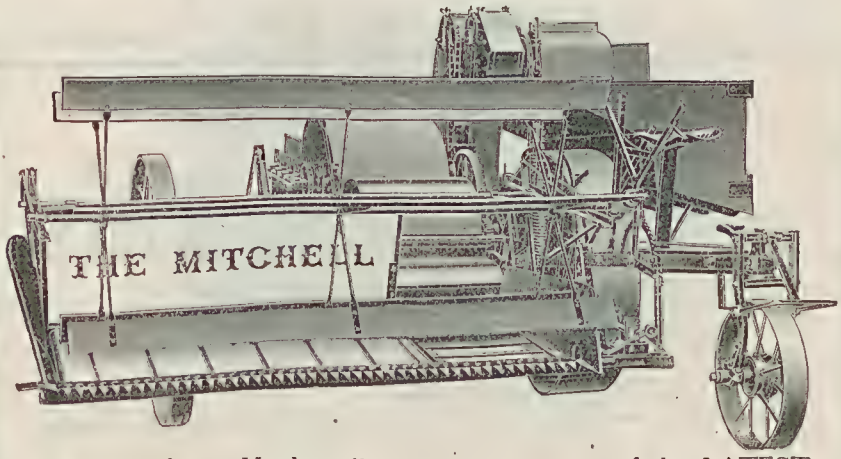

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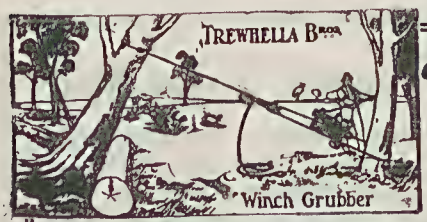

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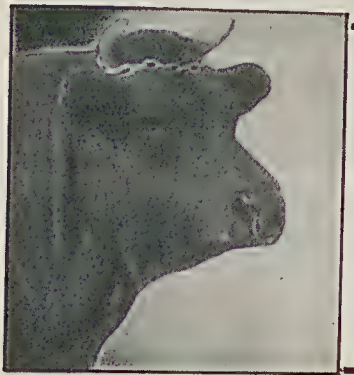

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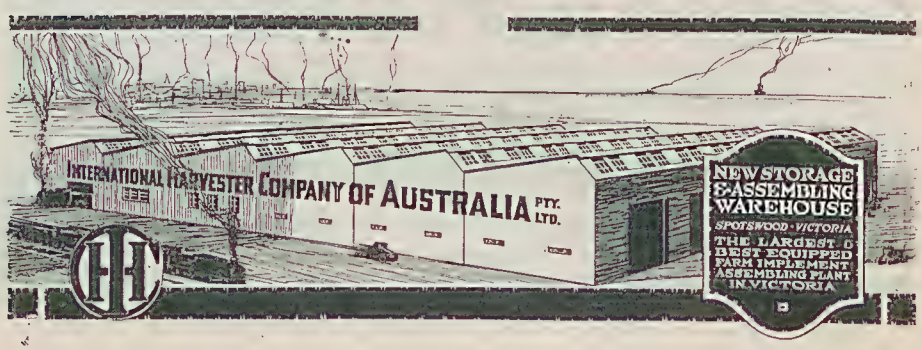
INTERNATIONAL HARVESTER COMPANY OF AUSTRALIA PTY. LTD.
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THE JOURNAL

OF THE

Department of Agriculture

OF

VICTORIA.

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FARMERS' FIELD DAY AT WERRIBEE.

The Annual Field Day at the State Research Farm at Werribee was held on the 29th September, when there was an attendance of about 500 farmers from various parts of the State. It was the eighth field day since the inception of the farm, and at least one of those present had attended each gathering. "I was here first in 1913, when the farm was just started," he said, "and it's a pity some more of us country people couldn't come along, not only to see what is being done, but at the same time to pick up a few useful hints"—a sentiment that later in the day was expressed by both His Excellency the Governor and the Assistant Minister of Agriculture.

The tour of inspection, under the guidance of the Agricultural Superintendent (Mr. A. E. V. Richardson), commenced at the rotation plots, where the value of the various systems of rotation cropping was in most cases observable at a glance.

A visit was made to the stud cereal and cross-bred plots, where Mr. Richardson briefly explained the experiments that are being made and some of the more important recent results. The chief plant-breeding work is with wheat, but some experiments in the raising of oats and barley are also being conducted. Several new varieties of oats appear to be promising—one in particular, a variety much earlier than Algerian, which last year yielded 63 bushels per acre. Tests of new standard varieties of barley and some cross-breds are also being made. The result from the Cape Variety last year was very satisfactory, its yield being 73 bushels to the acre.

At the permanent fertilizer plots the results from the different experiments were given, and samples of crop from several of the plots were exhibited side by side in order to bring home better the results to be expected from the application of various manures and the value in some cases of feeding off.

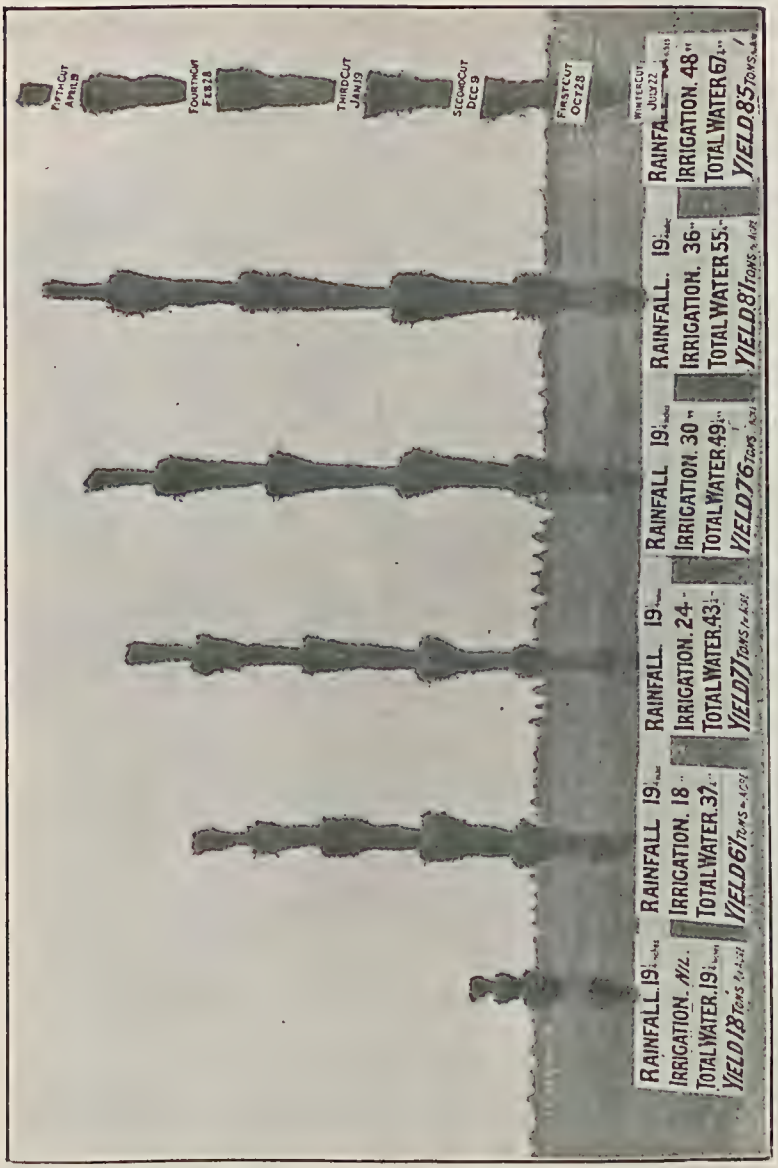
The lucerne field was of great interest to most of the visitors. Here, in addition to experiments to determine the best stage at which to cut lucerne and tests in the effects of different fertilizers and increasing quantities of water, trials are being made with varieties from several parts of the world. Hunter River lucerne has, over the two seasons, given the best yield of hay, being approached only by Italian. Further, during the winter, Hunter River was very prominent, while Italian made but little growth. Grimm and Japanese were also very poor during the winter, but in the summer they produced a leafy hay with fine stems. South African approached most closely to Hunter River in regard to winter growth. It appeared to produce a better quality hay than the latter. French Provence did not make extra good winter growth, but it yielded well during the summer, and gave hay of good quality. Patagonian gave some heavy yields. It appears to grow more slowly than Hunter River.

Demonstration on Effect of Varying Fertilizers on Growth of Wheat and Oats.

The dairy farmers present eyed critically the Red Poll herd, founded by the Department twelve years ago, and from which some 300 young bulls have been sold to farmers throughout the State. The dairy herd of Friesians more recently established was also of great interest. The history of both herds was briefly given by Mr. Wilson, the farm manager. During the afternoon the Border Leicester and Suffolk flocks of the farm came under inspection, as did the Clydesdale stallion Baron Wigton, and a few of the visitors also made a visit to the poultry pens, where there are at present about 1,000 birds.

On the return of the party to the farmstead, afternoon tea was served in one of the barns. At its conclusion the Assistant Minister of Agriculture (Mr. J. W. Pennington, M.L.A.), in extending a welcome to the Earl of Stradbroke, said His Excellency was a practical farmer—unfortunately, his farm was not in Victoria—but he was taking a keen interest in the primary production of the State, which

they all greatly appreciated. He was pleased to see that there was even a larger gathering this year than there was on the last occasion, but at the same time there should have been a larger gathering—(hear,



Lucerne Poles Illustrating Yield of Lucerne Hay from Application of Varying Quantities of Water.

hear)—seeing that there were over 60,000 primary producers in Victoria.

In responding to Mr. Pennington's welcome, His Excellency said he was glad to have the opportunity of meeting farmers of the State,

and to find there were so many who were deeply and keenly interested in what was being done on the Research Farm. One was apt, as a farmer, to think more of the practice than of the theory of agriculture, but here they were fortunate in having the two combined, and it must be instructive to all of them to see what had been accomplished on the various experimental blocks and in the breeding of stock.

The great object of all our farmers was to convert into money what was grown on the land. To do that one must study, especially in stock-breeding, early maturing. Here they saw how fat lambs could

His Excellency the Governor interested in Clydesdales.

be produced—lambs which were selling from 24s. to 25s. He thought it was quite a good proposition for those who could rear fat lambs. They also saw experiments in regard to Red Polled cattle which might be utilized more extensively, especially on closer settlements. The men who kept dairies were seeking to get better results from their milk, and at the same time rear stock which would grow into good butcher's beef. The object of the farm was to show what could be done so as to get returns quickly, and to illustrate what were the most suitable cereals to grow on the available lands. Some of the experi-

ments being conducted on the farm could, perhaps, be carried on in a small way by the farmers themselves in their own district.

Demonstration on Suffolk and Border Leicester Sheep.

Clydesdale Mares.

There was one thing which was not taken up in Victoria, and that was the matter of breeding a good, marketable pig. In the Old Country it was often said that to make a farm pay they must have cows and

sows. Knowing the requirements on the other side of the water, it seemed to him that the pigs grown in Victoria were of too fat a nature. They could test whether this was so, but he strongly advised them to look into the question of obtaining a good market for bacon and ham, and then, having secured it, to maintain that market. If they wanted to go in for bacon and ham they must produce them with less fat, and they would then win the export market.

There was another thing he had noticed going around the estate, and that was the impending shortage of timber. This was an important thing to many of them. (Hear, hear.) They had their fences to maintain, and they also needed fuel. Although the State could do a great deal in the matter of re-afforestation it seemed to him to be an expensive thing to undertake. The planting of trees seemed to be almost a prohibitive proposition from the point of paying, but they should have their holdings planted with trees which would in the future be of great use to them for fencing and fuel. In some parts of the State fuel was an expensive thing to buy, and they must look to the requirements of future generations. They should remember that they wanted to leave things on the farm better than they were before they first took up the land.

In conclusion, he said he hoped these annual gatherings would become better and better attended, and be of interest to all the farming interests throughout the State. (Applause.)

Mr. Pascoe, M.P. (Minister of Agriculture, South Australia), moved a vote of thanks to the Governor for his visit to the farm. Knowing what experimental agriculture meant, he said the fact that an institution of this character was being maintained at a loss of only £1,200 a year reflected great credit upon the management and the Department generally. (Applause.) They had every reason to be proud of what had been accomplished there. They should also be proud that they had in the State Governor a man who was taking an interest in the primary industry of the State. He believed it had been a very distinct advantage that they had had in South Australia during the last few years an "agricultural Governor," especially in regard to dairy cattle, in the person of Sir Archibald Weigall. Where they possessed a Governor with a knowledge of agriculture, who was willing to give his own experience to the people of Victoria, they would find him to be a wonderful asset to the State. (Applause.)

OLD JOURNALS OF AGRICULTURE REQUIRED.

The issues of this *Journal* for the months of September, 1920, and January, February, and August, 1921, are out of print.

As requests for these issues are being received, principally from libraries desirous of completing their sets, we would be grateful if any of our readers possessing copies for which they have no further use, would post them to the Department of Agriculture. Postage will be paid by the Department.

CODLIN MOTH EXPERIMENTS.

Owing to the prevalence of codlin moth during the season 1920-21, the Department of Agriculture decided to conduct experiments to determine the efficacy of the sprays generally used for this purpose.

Those experiments were carried out in the following districts:—

Mr. Butuch's orchard, Harcourt, under the supervision of Mr. S. A. Cock.

Mr. H. L. Tompkins' orchard, Kilsyth, under the supervision of Mr. J. Farrell.

Messrs. Swan Bros.' orchard, Londrigans, under the supervision of Mr. C. F. Cole.

Messrs. Stockton Bros.' orchard, Hastings, under the supervision of Mr. R. Wadeson.

Messrs. Stockton Bros.' orchard, Kyabram, under the supervision of Mr. W. Nicholls.

Mr. Hugh Darker's orchard, Amphitheatre, under the supervision of Mr. W. Chalmers.

Mr. Hugh Darker's orchard, Diamond Creek, under the supervision of Mr. G. Fletcher.

The growers who placed the plots at the disposal of the Department for the experiments, and rendered such valuable assistance to the supervisors while they were being conducted, deserve, not only the thanks of the Department, but also of the fruit-growers of the State. It will be seen that, to ascertain as far as possible the value of each spray, each of the different groups of trees in the experiments had one spray omitted. The result showed that, next to not spraying at all, on the average the omission of the calyx spray was responsible for the worst crops.

As might have been expected, there are variations in the results that cannot be explained; in the case of the Howell pear groups the lowest percentage of clean fruit, except on the unsprayed one, occurs in the group where all the sprays were applied in the form of a mist. One cannot expect, however, mathematical accuracy in tests of this kind, as there are many factors to be taken into consideration in arriving at results. Where all "force" sprays were used in the same experiment much more satisfactory results were obtained. As a matter of fact, the force sprays on the whole gave greater satisfaction than the mist sprays. "Force sprays" are got by holding the nozzle of the spray pump close up to its work, while "mist sprays" are applied to those where the nozzle is held at a distance, so that the spray may fall in the form of a mist on fruit and leaves. The operator must, however, use discretion in applying his spray, and force should be used to drive it in between any fruit growing in close

clusters, otherwise the codlin will not be affected if attacking where the apples are touching.

The experiments go to show that no spray can be omitted without loss of fruit from codlin attacks. The calyx and February sprays are most important, and should not be overlooked.

Arsenate of lead was used in the experiments, and was taken from the stock used by the growers in whose orchard the experiments were conducted, so that it could not be said advantage was obtained by the use of any special brand.

As reported by the Government Agricultural Analyst, all brands of arsenate of lead on the market are sufficiently high in arsenious acid content to be effective against codlin, if applied at the right times.

It cannot be too firmly impressed upon growers, the necessity of having the spray applied a short time before the attack of the codlin, as after the grub enters the apple, no amount of spraying will have any effect. As climatic conditions have an influence on the life history of the moth, the applications of the spray will require to be increased during a long spell of hot dry weather.

To obtain a comparison of the value of strengthening the spray, duplicate groups were sprayed with an increase of, approximately, 50 per cent. of arsenate of lead.

Average Percentage of Clean Fruit in the Different Groups.

Strength of Sprays.	No Spray given.	All Sprays given.	1st Spray omitted.	2nd Spray omitted.	3rd Spray omitted.	4th Spray omitted.	5th Spray omitted.
4 and 5 lbs to 100 gallons..	44·19	97·51	94·23	97·07	95·9	95·24	96·85
6 and 7 lbs to 100 gallons..	..	97·07	91·56	93·3	95·93	95·96	97·25

The results show that no advantage, generally speaking, was obtained by this increase. The stronger solution was slightly more effective when applied on the last sprays of the season, while the weaker held preference in the earlier sprays. Their demonstration of this fact will be of considerable monetary value to growers, as not a few make it a practice to apply solutions of even greater strength than was used in the experiments.

All codlin-attacked apples that fell throughout the season and that were on the trees at the time of picking were counted in the experiments carried out at Kilsyth, Harcourt, and Londrigans, while at Hastings only those on the trees at the time of picking were taken in the count.

The experiments at Kyabram, Amphitheatre, and Diamond Creek were carried out in a more general way, but with equally satisfactory results.

Details of Experiments at Mr. Tompkins' Orchard, Kilsyth.

Apples.

(Conducted by Orchard Supervisor Farrell.)

Groups of Trees.	Clean Fruit.	Affected Fruit.	Percentage of Clean Fruit.	When Sprayed.	Strength of Spray.	How applied.
A. 3 Jonathan Apples	965	40	96	1st. 28.10.21 2nd. Omitted 3rd. 13.12.21 4th. 12.1.22 5th. 3.2.22	4 lbs. to 100 gals. 4 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals.	Mist
B. 3 Jonathan Apples	862	107	88.95	1st. Omitted 2nd. 16.11.21 3rd. 13.12.21 4th. 12.1.22 5th. 3.2.22	Same as A ..	Mist
C. 3 Jonathan Apples (check)	290	476	37.85	Unsprayed		
D. 3 Jonathan Apples	1,110	57	95	1st. 28.10.21 2nd. 16.11.21 3rd. 13.12.21 4th. 12.1.22 5th. 3.22.2	Same as A ..	Force Mist
E. 3 Jonathan Apples	927	75	92.5	1st. 28.10.21 2nd. 16.11.21 3rd. 13.12.21 4th. Omitted 5th. 3.2.22	Same as A ..	Force. Mist
F. 3 Jonathan Apples	2,069	62	97	1st. 28.10.21 2nd. 16.11.21 3rd. 13.12.21 4th. 12.1.22 5th. Omitted	Same as A ..	Mist
G. 3 Jonathan Apples	860	19	97.8	1st. 28.10.21 2nd. 16.11.21 3rd. 13.12.21 4th. 12.1.22 5th. 3.2.22	Same as A ..	Force

Duplicate Group.

A. 3 Jonathan Apples	790	87	90	1st. 28.10.21 2nd. Omitted 3rd. 13.12.21 4th. 12.1.22 5th. 3.2.22	6 lbs. to 100 gals. 6 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals.	Mist
B. 3 Jonathan Apples	769	98	88·69	1st. Omitted 2nd. 16.11.21 3rd. 13.12.21 4th. 12.1.22 5th. 3.2.22	Same as A ..	Mist
C. 3 Jonathan Apples (check)	171	74·0	18·77	Unsprayed		
D. 3 Jonathan Apples	668	80	89·3	1st. 28.10.21 2nd. 16.11.21 3rd. 13.12.21 4th. 12.1.22 5th. 3.2.22	6 lbs. to 100 gals. 6 lbs. to 100 gals. 6 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals.	Force Mist
E. 3 Jonathan Apples	943	90	91·28	1st. 28.10.21 2nd. 16.11.21 3rd. 13.12.21 4th. Omitted 5th. 3.2.22	Same as D ..	Force Mist
F. 3 Jonathan Apples	786	46	94·47	1st. 28.10.21 2nd. 16.11.21 3rd. 13.12.21 4th. 12.1.22 5th. Omitted	Same as D ..	Mist
G. 3 Jonathan Apples	662	31	95·52	1st. 28.10.21 2nd. 16.11.21 3rd. 13.12.21 4th. 12.1.22 5th. 3.2.22	Same as D ..	Force

Details of Experiments at Mr. Tompkins' Orchard, Kilsyth.

PEARS.

(Conducted by Orchard Supervisor Farrell.)

Groups of Trees.	Clean Fruit.	Affected Fruit.	Percentage of Clean Fruit.	When Sprayed.	Strength of Spray.	How applied
A. 3 Howell Pears ..	1,120	10	99·17	1st. 18.10.21 2nd. Omitted 3rd. 16.11.21 4th. 13.12.21 5th. 12.1.22	4 lbs. to 100 gals. 4 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals.	Mist
B. 3 Howell Pears ..	1,038	32	97	1st. Omitted 2nd. 28.10.21 3rd. 16.11.21 4th. 13.12.21 5th. 12.1.22	 4 lbs. to 100 gals. 4 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals.	Mist
C. (check) 1 Howell Pear ..	250	207	54.7	Check unsprayed		
D. 3 Howell Pears ..	1,018	67	93·8	1st. 18.10.21 2nd. 28.10.21 3rd. 16.11.21 4th. 13.12.21 5th. 12.1.22	4 lbs. to 100 gals. 4 lbs. to 100 gals. 4 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals.	Force Mist
E. 3 Howell Pears ..	1,047	10	99	1st. 18.10.21 2nd. 28.10.21 3rd. 16.11.21 4th. Omitted 5th. 12.1.22	4 lbs. to 100 gals. 4 lbs. to 100 gals. 4 lbs. to 100 gals. 5 lbs. to 100 gals.	Force Mist
F. 3 Howell Pears ..	1,156	18	98·46	1st. 18.10.21 2nd. 28.10.21 3rd. 16.11.21 4th. 13.12.21 5th. Omitted	4 lbs. to 100 gals. 4 lbs. to 100 gals. 4 lbs. to 100 gals. 4 lbs. to 100 gals. 	Mist
G. 3 Howell Pears ..	710	9	98·74	1st. 18.10.21 2nd. 28.10.21 3rd. 16.11.21 4th. 13.12.21 5th. 12.1.22	4 lbs. to 100 gals. 4 lbs. to 100 gals. 4 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals.	Force

DUPLICATE GROUP.

A. 3 Keiffer Pears ..	1,630	136	92	1st. 11.10.21 2nd. Omitted 3rd. 16.11.21 4th. 13.12.21 5th. 12.1.22 6th. 3.2.22 7th. 1.3.22	6 lbs. to 100 gals. 6 lbs. to 100 gals. 6 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals.	Mist
B. 3 Keiffer Pears ..	1,890	163	92	1st. Omitted 2nd. 28.10.21 3rd. 16.11.21 4th. 13.12.21 5th. 12.1.22 6th. 3.2.22 7th. 1.3.22	Same as A ..	Mist
C. 3 Keiffer Pears ..	1,670	637	72·38	Unsprayed		
D. 3 Keiffer Pears ..	2,455	57	97·73	1st. 11.10.21 2nd. 28.10.21 3rd. 16.11.21 4th. 13.12.21 5th. 12.1.22 6th. 3.22.2 7th. 1.3.22	Same as A ..	Force Mist
E. 3 Keiffer Pears ..	2,883	71	97·59	1st. 11.10.21 2nd. 28.10.21 3rd. 16.11.21 4th. Omitted 5th. 12.1.22 6th. 3.2.22 7th. 1.3.22	Same as A ..	Force Mist
F. 3 Keiffer Pears ..	2,750	52	98·14	1st. 11.10.21 2nd. 28.10.21 3rd. 16.11.21 4th. 13.12.21 5th. Omitted 6th. 3.22.2 7th. 1.3.22	Same as A ..	Mist
G. 3 Keiffer Pears ..	1,314	20	98.5	1st. 11.10.21 2nd. 28.10.21 3rd. 16.11.21 4th. 13.12.21 5th. 12.1.22 6th. 3.2.22 7th. 1.3.22	Same as A ..	Force

Details of Experiments at Mr. Butuch's Orchard, Harcourt.

APPLES.

(Conducted by Orchard Supervisor Cock.)

Groups of Trees.	Clean Fruit.	Affected Fruit.	Percentage of Clean Fruit.	When Sprayed.	Strength of Spray.	How applied.
A. 3 Munro Apples ..	6,596	94	98·6	1st. 25.10.21 2nd. Omitted 11.11.21 3rd. 2.12.21 4th. 20.12.21 5th. 16.1.22 6th. 6.2.22	4 lbs. to 100 gals. 4 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals.	Mist
B. 1 Munro Apple ..	1,104	386	74·1	Unsprayed		
C 3 Munro Apples ..	4,434	204	95·6	Same as A, but 5th spray omitted	Same as A ..	Mist
D. 3 Munro Apples ..	4,753	163	96·7	Same as A, but 4th spray omitted	Same as A ..	Force
E. 2 Munro 1 Rymer	5,820	343	94·5	Same as A, but 1st spray omitted	Same as A ..	Force
F. 2 Munro 1 Rymer	4,243	342	92·6	Same as A, but 6th spray omitted	Same as A ..	Mist
G. 3 Munro Apples ..	3,935	287	93·2	Same as A, but 3rd spray omitted	Same as A ..	Force

DUPLICATE GROUP.

A. 3 Rymer Apples ..	8,180	430	95	1st. 31.10.21 2nd. Omitted 3rd. 2.12.21 4th. 20.12.21 5th. 16.1.22 6th. 6.2.22 7th. 28.2.22	6 lbs. to 100 gals. 6 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals.	Force
B. 3 Rymer Apples ..	4,681	590	88·8	1st. Omitted 2nd. 11.11.21 3rd. 2.12.21 4th. 20.12.21 5th. 16.1.22 6th. 6.2.22 7th. 28.2.22	Same as A ..	Mist
C. 3 Rymer Apples ..	7,747	520	93·7	Same as B, but 3rd instead of 1st spray omitted	Same as A ..	Force
D. 1 Rymer Apple ..	1,182	721	62·1	Unsprayed		
E. 3 Rymer Apples ..	5,010	105	98	Same as C, but 5th spray omitted	Same as A ..	Force
F. 3 Rymer Apples ..	5,215	256	95·3	Same as E, but 6th spray omitted	Same as A ..	Mist
G. 3 Rymer Apples ..	5,449	397	93·2	4th and 7th sprays omitted	Same as A ..	Mist

Details of Experiments at Mr. Stockton's Orchard, Hastings.

(Conducted by Orchard Supervisor Wadeson.)

Groups of Trees.	Clean Fruit.	Affected Fruit.	Percentage of Clean Fruit.	When Sprayed.	Strength of Spray.	How applied.
A	3,761	144	96·2	1st. 3.11.21 2nd. Omitted, 17.11.21 3rd. 19.12.21 4th. 17.1.22 5th. 16.2.22	4lbs. to 100 gals. 4 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals.	Mist
B	3,713	142	96·3	Same, as A, but 1st spray omitted	Same as A ..	Mist
C	168	272	38	Unsprayed		
D	2,230	45	98	Same as A, but 3rd spray omitted	Same as A ..	First spray force, later ones mist
E	1,828	47	97·5	Same as A, 4th spray omitted	Same as A ..	First spray force, others mist
F	3,021	137	95·6	Same as A, 5th spray omitted	Same as A ..	Mist
G	3,270	45	98·6	Same as A, but no spray omitted	Same as A ..	Force
H	2,577	24	99	Same as G ..	Same as A ..	First three force, next two mist
I	2,862	45	98·4	Same as G ..	Same as A ..	Mist

DUPLICATE GROUP.

A	2,647	102	96·2	1st. 3.11.21 2nd. Omitted, 17.11.21 3rd. 19.12.21 4th. 17.1.22 5th. 16.2.22	6lbs. to 100 gals. 6 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals.	Mist
B	2,336	124	94·9	Same as A, but 1st spray omitted	Same as A ..	Mist
C	168	272	38·2			
D	5,336	105	98	Same as A, but 3rd spray omitted	Same as A ..	First spray force, remainder mist
E	3,664	66	98·1	Same as A, but 4th spray omitted	Same as A ..	First spray force, remainder mist
F	3,732	58	98·4	Same as A, but 5th spray omitted	Same as A ..	Mist
G	3,427	19	99·4	All sprays given	Same as A ..	Force
H	3,903	11	99·7	Same as G ..	Same as A ..	First three force, next two mist
I	4,802	21	99·5	Same as G ..	Same as A ..	Mist

Details of Experiment at Messrs. Swan Bros.' Orchard, Londrigans.

(Conducted by Orchard Supervisor Cole.)

Groups of Trees.	Clean Fruit.	Affected Fruit.	Percentage of Clean Fruit.	When Sprayed.	Strength of Spray.	How applied.
A. 3 trees	1,350	42	96·9	1st. 25.10.21 2nd. 8.11.21 3rd. 24.11.21 4th. 16.12.21 5th. 6.1.22 6th. 10.2.22	6 lbs. to 100 gals. 6 lbs. to 100 gals. 6 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals. 7 lbs. to 100 gals.	Mist Force Mist
B. 3 trees	1,545	109	93·4	Same as A, 1st spray omitted	Same as A ..	Mist
D. 3 trees	1,712	69	96·1	Same as A, 3rd spray omitted	Same as A ..	First force, four others mist
E. 3 trees	1,954	62	96·9	Same as A, 4th spray omitted	Same as A ..	First two force, then mist sprays
F. 3 trees	1,524	121	92·6	Same as A, 5th and 6th sprays omitted	Same as A ..	Mist
G. 3 trees	1,569	118	93	Same as A, 2nd and 6th sprays omitted	Same as A ..	Force

Duplicate Group.

A. 3 trees	1,959	93	95·4	1st. 25.10.21 2nd. Omitted, 8.11.21 3rd. 24.11.21 4th. 16.12.21 5th. 5.1.22 6th. 10.2.22	4 lbs. to 100 gals. 4 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals. 5 lbs. to 100 gals.	Mist
B. 3 trees	983	65	93·7	Same as A, 1st spray omitted	Same as A ..	Mist
C. 3 trees	276	1,412	16·3	Unsprayed		
D. 3 trees	1,284	46	96·5	Same as A, 3rd spray omitted	Same as A ..	First spray force, then four mist sprays
E. 3 trees	1,635	170	90·5	Same as A, 4th spray omitted	Same as A ..	First spray force, then four mist sprays
F. 3 trees	1,224	35	97·2	Same as A, 5th spray omitted	Same as A ..	Mist
G. 3 trees	1,610	19	98·8	All sprays applied	Same as A ..	Force

THE CONTROL OF THE GRUB OF THE POTATO MOTH.

By J. T. Ramsay, Potato Expert.

Potato-growers throughout the Commonwealth have for many years sustained very heavy losses from the damage done to potato tubers by the grub of the potato moth.

The actual damage is effected by the larvæ of the moth (*Lita solanella*) attacking the tubers by penetrating the skin and tunnelling their way through the flesh, thereby rendering the tubers unfit for consumption. The tubers may be damaged either before or after harvest.

Many efforts have been made to combat the ravages of this pest—(i) by treatment of the seed; (ii) by spraying growing crops; (iii) by storage in moth-proof chambers; and (iv) by cultivation.

Up to the present season, only the last treatment has proved in any degree feasible and successful.

Treatment of the seed has hitherto been found ineffective (in a practicable way), either for the protection of the seed (without impairment of the germinating power) or for the protection of the crop grown from treated seed.

Spraying the crop is too expensive, because even with a spray capable of killing the moth egg and grub (and it is doubtful if a spraying solution with this efficiency, which would not damage the crop, can be compounded), continuous spraying would have to be made on areas planted with potatoes to prevent infection from insects harbored on other host plants outside of, but adjacent to, these areas. This can easily be understood when it is pointed out that the increasing leaf surface due to growth would, until development of the haulms ceased, continually present an untreated portion as an invitation to the moth. Spraying, therefore, though possible, is not practicable.

Storage in moth-proof chambers is also impracticable, because—(i) it is almost certain that infection would be accomplished before storage could be effected; and (ii) because the erection and maintenance of moth-proof chambers would be prohibitive.

Fumigation as a means of combat is ruled out of court for the same reason. These arguments can be appreciated by growers who have, from year to year, suffered losses, partial or complete, from this insignificant-looking but powerful enemy.

It has been demonstrated that, by keeping the soil in which the crop is grown well tilled, so that a fine mulch can be moulded over the tubers, the grub is prevented greatly from getting access to these. Where cultivation is bad, the tubers in any soil are placed directly at the mercy of the grub. Loose sandy soils give the best protection; but unless this class of soil is kept well tilled or moulded over the rows of the crop, it is liable to be washed down by rains, or blown down by wind, to such a degree that the tubers nearest the surface are exposed to the air, and, incidentally, to the grub.

Potato Moth (*Lita Salanella*, **Boisd**).

1. Moth. Magnified.
1A. Moth. Natural size.
2. Pupa. Magnified.
3. Head and first three segments of larva. Upper side. Magnified.
3A. Head and first three segments of larva. Under side. Magnified.
4. Potato sliced to show effects of attack by larvæ of moth. Natural size.
5. Larva. Natural size.
6. Foreleg. Moth.
7. Hind leg. Moth.

1.—Treated seed—preserved clean. 2.—Untreated seed—100 per cent. damaged.

Soils of a loamy or clayey character, if not well cultivated, are liable to become baked or caked on the surface by the action of rain. Subsequent drying by sun and wind tends to crack this caked surface into tiny fissures by route of which the grub gets easy access to the tubers.

Good cultivation is found a great protection to the crop from the damage by grubs, but it has its limit of protection found when harvesting commences. Immediately the tubers are exposed by hand or mechanical digging, the moth, in seasons favorable to it, makes its appearance, lays its eggs on the exposed tubers, and the grower is in trouble, for within a few days the eggs are hatched, and the larvæ actively engaged on the potatoes.

Growers are only too well aware of the rapidity and extensiveness of the work of this pest, and will agree that bagging or removal cannot be done, in a practical way, quickly enough to defeat the attack of the ubiquitous moth.

A considerable measure of relief is now placed at the hands of growers in the form of an emulsified oil compound known as Tuberol. There was submitted to this Department in February last a quantity of this compound, for which it was claimed, amongst other things, that it would effectively prevent damage to potatoes by grub.

The importance of any material having this property, capable of being used in a practical and economical way, being so great, it was subjected to a trial under conditions similar to those prevalent in places where potatoes are usually stored.

A description of the test, and the results obtained, are given hereunder.

For the purpose of the test, a supply of (*a*) perfectly clean tubers; and (*b*) grub-infested tubers, was secured.

On 27th February, 1922, these were subjected to the following treatments, all of the tubers being unsprouted and of recent digging:—

(i) Clean tubers were immersed in a 1 in 30 solution of Tuberol for 15 hours.
(ii) Infested tubers were immersed in a 1 in 30 solution for 15 hours.
(iii) Infested tubers were immersed in a 1 in 30 solution for 5 minutes.
(iv) Infested tubers were left untreated.
(v) Five lots of clean tubers were immersed in a 1 in 30 solution for 5 minutes.
(vi) Two lots of clean tubers were left untreated for a check.
(vii) Infested tubers untreated were stored adjacent to the above variously treated lots, so that the active moth and grub would environ the whole of the stocks subjected to the test.

The period of the test extended from 27th February, 1922, till 31st August, 1922.

The moth and the grub were very active from the beginning of the test till early in June, a period of about 3 months.

All of the various treatments were under practically daily observation from the beginning of the test till the end of August, before which time the activity of the grub had apparently ceased.

The results are tabulated hereunder:—

Lot.	Remarks.	Percentage free from Grub.	Percentage affected by Grub.	Condition of Sprouts.
I.	Grubs were at times noticed crawling over these, but the tubers remained undamaged	100	None	All well sprouted and healthy
II.	An odd dead grub was found on these	None	100	Majority of sprouts destroyed by grub, the balance being healthy
III.	A few dead grubs were found on these	None	100	A few sprouts destroyed, the balance healthy
IV.	Tubers practically useless ..	None	100	All sprouts destroyed
V.	Tubers remained perfectly clean, though the grub was at times noticed on them	100	None	Well sprouted, all healthy
VI.	All damaged, and practically useless	None	100	All sprouts damaged
VII.	Tubers practically useless ..	None	100	All sprouts damaged

The results are remarkably even. It is considered that the test, as carried out, was equally severe with any condition that would obtain in the ordinary storage of seed potatoes, yet, in not one case was a treated tuber damaged by the grub, although grubs surrounded and crawled over them. The fact that sprouting is not affected by the solution, and that an immersion of five minutes is sufficient to render tubers immune from damage, is of great importance to the grower. That tubers intended for consumption could be protected from damage is proved, but no opinion can be given at present as to whether the cooking flavour or quality would be affected, as all of the lots utilized in the test were stored throughout in a well-lit room, and were therefore rendered unfit for table use owing to the greening effect of the daylight.

It is estimated that 1 gallon of the compound would make sufficient dip to treat 2 tons of potatoes; and, of course, the greater the quantity treated the less material would be necessary per ton.

Illustrations are given of various stages of the grub pest, and of tubers treated and untreated.

COW TESTING ASSOCIATIONS.

OBJECT, FORMATION, AND MANAGEMENT.

Object.

The object of a Cow Testing Association is the gradual elimination of those cows which show least profit, so that a herd may consist of wholly profitable units. There is no other way than testing by which this knowledge may be obtained. *Every cow should be tested* regularly and continuously, so that those becoming unprofitable may be rejected without delay.

Formation.

When several dairy farmers in a neighbourhood become interested in the question, a meeting of all the dairy farmers of the district should be convened by one of the number. Preferably the meeting should be held on a date convenient for the attendance of an officer of the Department of Agriculture, who would address the meeting on the subject of testing, and give such information as would enable his hearers to clearly apprehend the advantages to be gained by pursuing a methodical and thorough system of testing.

Those present at this meeting might there and then resolve to form an Association, appointing a secretary (*pro tem.*) meanwhile, and preparing a list of all the dairy farmers of the district, with the number of cows each possesses, with a view to securing their interest and their attendance at a meeting to be held at a date not too far removed from the preliminary meeting.

Membership.

Membership of the Association should be open to any person in the district who is engaged in the production of milk as a means of, or towards, a livelihood, and who will undertake to observe the rules of the Association.

Conditions of membership should be made as simple as possible, but should embrace some vital principles, such as:—

(*a*) *Each member will pay an annual subscription,* the amount of which will be determined by the total expenses of the Association, carefully and economically estimated, and based upon a rate per cow. This subscription should be paid in advance, either in full or in two instalments, with a proviso that any expenditure over and above the estimate be shared by members on the same basis, provided that such expenditure has been officially sanctioned. On this, see also paragraph "Finance."

(*b*) *Each member should give an undertaking to continue in membership for a period of at least two years,* provided that he may be released from membership in the event of his discontinuing dairy farming, or removing from the district meanwhile.

(*c*) *Each member should pledge himself to faithfully observe the rules and requirements of the Association* for such time as he shall continue in membership.

By a general observance of these principles the work will not be retarded by lack of funds; the members will feel assured of continuity of effort throughout the whole of the initial period, and the undoubted results will establish the confidence of members in the effectiveness of their methods.

In most Associations formed hitherto some members have discontinued at the end of the first year, in a mistaken belief that one year's testing was sufficient, and the numerical strength of the Association has been kept up only by continued effort to secure new members, which is not at all satisfactory.

In Denmark, each member of such an Association must give a written guarantee of five years' support, from which he may be relieved only by his discontinuance of dairy farming, or equally good reasons.

Whilst a guarantee for such a lengthy period as five years may not be practicable in this country, a two years' undertaking would result in satisfactory work—a farmer being able thereby to note the progress made as a result of the first year's culling.

Each successive year will be attended by evidence of continued improvement. The heifers from the cows tested during the first year will be ready for test in the third season, and so each succeeding year will bring to the judgment of the Scales and Babcock Tester a fresh lot of heifers from the best cows, and only the best of these will be retained, particularly if the herd remain stationary in numbers, when the owner cannot possibly absorb the whole of his heifers each year.

Management.

One competent man is required to effect tests, keep records, conduct correspondence, receive and despatch bottles, &c. With 2,200 cows under test, the time of a capable man would be fully occupied throughout the season. Very few men suitable for the work will be found willing to take it up for one season only, and frequent changes are undesirable. To attract a suitable man, some degree of permanency should attach to the position—with, of course, the usual safeguards.

Here, again, the necessity for a solid foundation for the Association is demonstrated. Added to what has already been said, it may now be laid down that a good Association should embrace 2,000 cows, or more. Not that an Association embracing 1,500 cows would not be profitable, but as one capable man can test from 2,000 to 2,200 cows, the better plan is to work to the full capacity, and pay a good salary to a capable man rather than to offer less work with a correspondingly smaller salary to a less capable man.

Another advantage of a 2,000 cow basis is that, of course, the cost per cow would be less than in an Association involving a lesser number.

The salary which should be paid to a competent officer would vary with circumstances, but an Association having under test 2,000 cows or more, could easily pay £4 weekly without an undue tax upon the members.

The officer's duties may be more fully defined as follows:—

To attend to all correspondence;
To keep a proper record of all expenditure;
To cleanse all bottles, glassware, &c., used in the test;

To receive from members of the Association their samples of milk, and test the same;

To record results of test and compile from such records tables showing:—

(*a*) Total weight of milk given for the period and for the season by each cow;

(*b*) Total weight of butterfat contents of milk given for the period and for the season by each cow;

(*c*) The average quantity of milk and butterfat, and average test, per cow in each herd; the average association cow, &c.

Finance.

A Herd Testing Association could be worked most economically from the local dairy factory (where one is in operation), as steam for power and cleansing would be there available and the cost of purchase and installation of a boiler would thereby be avoided.

In fact, in the case of the smaller Association, an arrangement might be made for the use of factory apparatus entirely, and thus the initial outlay would be appreciably reduced. The charges then to be met would be made up of officer's salary, freights, acid, and stationery; and, excepting salary, those charges would be light, particularly in districts where the boxes could be carried by the factory company's waggons.

In some instances factory proprietors have furnished an Association with a room and with steam free of charge, and, indeed, it might well pay them so to do, for increase in production from herds under test would be reflected in better factory returns.

But even if an office had to be provided, the cost would not be considerable. If rented, the rent would not amount to a great deal, and if specially constructed, the cost would be about £100, and the provision for interest on capital expenditure and ordinary depreciation would not appreciably add to the charges on each member of the Association.

The financing of such an Association is frequently undertaken by the factory company operating in the district, and the plan usually adopted, and which has proved mutually satisfactory, has been on lines as follow:—

Apart from the purchase of each member's outfit, comprising box for milk samples, bottles, labels, spring-balance scales, dipper and lock, the Association has been financed by the dairy company, and at the end of the season the cost has been distributed *pro ratâ* over the number of cows under test, and members debited accordingly.

A charge of 9d. per cow has sufficed for each member's outfit, with a small margin over actual cost, and this margin has practically sufficed for such expenses as postage and stationery.

A further charge of from 2s. 9d. to 3s. per cow per annum has been found sufficient to cover the cost of testing and working expenses, including salary.

Equipment.

The equipment required at the testing centre and approximate cost of same is as follow:—

Apparatus.

	£	s.	d.
1 36 to 40 bottle Babcock Tester—say	13	0	0
24 dozen test bottles, at 12s. per dozen	14	8	0
6 17.6 milk pipettes, at 1s.	0	6	0
1 specific acid hydrometer	0	3	0
1 divider	0	1	0
1 20-oz. acid measure	0	3	0
1 acid burette and stand (metal)	0	17	0
6 test bottle cradles (holding 36 to 40 each) ..	1	1	0
Bingham's butterfat tables	1	8	0
Sundry fittings	3	0	0
	£34	7	0

It would be found advisable to order all apparatus required in good time, as large stocks, particularly in some of the lines, are not always held here.

Boxes.

Each member must be provided with a box of 4-oz. bottles, the number of bottles equalling, of course, the number of cows in his herd. Boxes with capacities of 20, 32, 40, and 50 bottles could be obtained at a cost of 7s. 6d. to 10s. each.

Bottles.

Bottles to contain 4 ounces, such as are used by the Department of Agriculture, would prove most suitable. The cost of these is about 15s. per gross, and corks would cost about 4s. a gross.

Methods—Districts and Numbers.

When the number of cows to be tested has been definitely ascertained, the district should be divided, as nearly as possible, equally, each district including about 1,000 cows. Those farms nearest to the main factory or depôt would form one district, the outlying farms would constitute the second. By such an arrangement the tester's work can be better organized.

Each herd under test should be given a number, and to avoid confusion and facilitate the testing officer's work, the number of cows in each district or section of a district should be indexed thus:—

A district having three divisions would show as—

A.—Allansford.
B.—Mepunga.
C.—Nirranda.

The herd number in each of those districts would then appear as—A1, A2, A3, and so on; B1, B2, B3; C1, C2, C3, &c.

Herd numbers would be attached to members' box keys by a brass or other tag, and they could also be stencilled on the front face of the box itself, then, if the boxes were placed one on top of the other, identification could be effected with little trouble.

Cow Testing Forms.

Forms as per the specimens attached should be used. Two copies of Form No. 1 should be enclosed in the box of sample bottles when it is sent to a member, and on these he will enter the weights of two milkings from each cow and return one of the completed forms to the testing depôt with the samples. The testing officer will complete the column for fat percentage when he tests the milk.

The total weight of milk for the day and the percentage of butterfat is now transferred to the office copy, and this Form 1 is now finished with.

The particulars are now transcribed from the office copy to Form 2, and this is forwarded to the member when his box of sample bottles is returned to him for the next test. Form 2 provides for additional information below the records of individual cows, viz.:—

Yield of average cow of the herd for 30-day period.
Milk lbs.
Test per cent.
Butterfat lbs.

The calculations are based on 30-day periods, comparisons being thus more readily made.

Duties of Members.

Each member of the first division should weigh the milk of each cow at two successive milkings between the 16th and the 21st of the month, and at each such two successive milkings pour a sample of each cow's milk into the bottle which is labelled with a number corresponding with the number of the cow concerned. A sample should consist of approximately one-half ($\frac{1}{2}$) ounce of milk for each 10 lbs. of milk yielded. These samples should reach the testing depôt not later than the 23rd of the month.

The members of No. 2 division receiving their boxes about the 22nd of the month should take their samples, in the manner set out in the preceding paragraph, between the 23rd and 28th of the month, and the samples should be in the hands of the testing officer not later than the 30th.

The foregoing arrangement would enable the testing officer to perform the whole work of testing at one portion of the month, and he will be able to give the remainder of his time to the compilation of his records and averages, together with other clerical work and despatch of boxes for next testing.

The allowance of five days in which samples may be taken is in order to allow for any minor ailments which some of the cows may be suffering, as, for instance, a rule is that sample shall not be taken from a cow that is "in season."

Appended are the forms which are suggested for the use of Cow Testing Associations.

.....*Cow Testing Association*

Herd No.....

FORM No. 1.

Owner—*Name*..... *Address*.....

Date of Weighings.....

Cows.					Weight of Milk.		Test.
Name.	Breed.	No.	Age.	Date of last Calving.	Morning. (lbs.)	Evening. (lbs.)	

.....*Cow Testing Association.*

Herd No......

FORM No. 2.

Owner—*Name*..... *Address*.....

Cow No.	Yield for 30-Day Period Ended.....			Total Yield from Calving to Date.		
	Milk. (lbs.)	Test.	Fat. (lbs.)	No. of Days.	Milk. (lbs.)	Fat. (lbs.)

Yield average cow this herd for 30-day period .....lbs.

Milk ,, ,, ,, ,, ...lbs.

Test average cow this herd for 30-day period .....per cent.

Fat ,, ,, ,, ,, ,, ...lbs.

.....*Cow Testing Association.*

FORM No. 3.

(This Form is for use at the end of the season to show the position of every herd. A copy of this Report should be forwarded to the Chief Veterinary Inspector, Department of Agriculture, Melbourne.)

Report for Season Ended.....

Herd No.	No. of Cows.	Herd Averages.			Highest Individual Yield. Calculated for Month.			Lowest Individual Yield. Calculated for Month.		
		Milk. (lbs.)	Test. (%.)	Fat. (lbs.)	Milk. (lbs.)	Test. (%.)	Fat. (lbs.)	Milk. (lbs.)	Test. (%.)	Fat. (lbs.)

WEEDS AND THEIR ERADICATION.

(Continued from page 480.)

(*By H. W. Davey, F.E.S., Orchard Supervision Branch, Department of Agriculture.*)

Paterson's Curse or Purple Bugless, *Echium violaceum.* Fam.: Boraginaceæ.

Unfortunately this plant is steadily increasing its hold in Victoria, more especially in the northern districts, and should be destroyed wherever its presence is discovered.

It is also found in portions of South Australia where it is known as Salvation Jane, while in New South Wales it goes by the name of Blue Weed or Paterson's Curse; the latter name it is supposed to have received from one, Paterson, who is credited with having first introduced this plant into Australia.

The genus Echium contains several species, 60 of which are probably natives of Europe, E. violaceum being a native of Austria. The generic name of Echium is derived from Echis, a viper, from a supposed resenblance of their seeds to the head of that reptile.

Paterson's Curse (Fig. 47) is a coarse bristly biennial plant, which during its first year usually produces a rosette of large rough leaves surmounting a strong deeply penetrating tap-root. When it reaches maturity, it is an erect, sturdy plant, having lanceolate, sessile leaves, which, with the stems, are well clothed with bristly hairs that any one who has hand pulled the plants with bare hands and experienced the cactus-like nature of these bristly spines will not be anxious to repeat the experience. This same feature causes the stock to leave the matured plants severely alone.

The flowers are purple-blue in colour, numerous and forming a curved panicle from 2 to 3 feet in height, which gives the plant a most pleasing appearance when it is in full bloom and in complete possession of the ground to the exclusion of all other vegetation.

On account of its strong tap-root the so-called Paterson's Curse is a difficult plant to hand pull, even with the hands protected by gloves, and is best mattocked or spudded out. A good strong draw-hoe is a very useful tool for this purpose on land that is not of too stony a nature.

In dealing with light infestations a sharp lookout should be kept for the first year rosettes, as these are much more easily hoed out than if left until the flower stems have arisen; and with vigilance the plant need not be allowed to gain ground. In places where it has thoroughly established itself, it becomes a difficult and costly matter to again get the upper hand of it.

Sheep will freely eat the plant when it is young, and a flock could be utilized for this purpose. Repeated stocking with sheep would go a long way towards the eradication of this pest, and assist in keeping down the amount of hired labour otherwise required. Plants too far advanced for the sheep to eat should be grubbed out so as to prevent any chance of their seeding.

Paterson's Curse.

(From Professor A. J. Ewart's *Weeds, Poison Plants, and Naturalized Aliens of Victoria.*)

Wild Verbena, Vervain or Purple Top.

On land fit for cultivation the difficulty is much less than on grazing country, although on old infested arable land it would probably be some years before the soil was free of the pest, owing to the successive germination of dormant seeds being brought to the surface during cultural operations.

Where it is possible to use a mowing machine, the plants should be cut and burnt. On large areas spraying with brine would be worth a trial, especially if this were sprayed over the plants during dry weather.

Tests made with crude petroleum at Porepunkah against Paterson's Curse did not give the results anticipated. On enclosed land such as railway reserves, arsenical preparations would be most useful in combating this and other bad weeds in places having a handy water supply available.

Paterson's Curse or Purple Bugless is proclaimed under the Thistle Act for the State of Victoria.

Wild Verbena, Vervain, or Purple Top, *Verbena bonariensis*, L.

Fam.: Verbenaceæ.

This plant (Fig. 48) is a large herbaceous perennial, often growing to over 4 feet in height. It was introduced from South America, and like many other weed introductions is a most useless species, often taking possession of the ground to the exclusion of better species. This verbena is now widely spread in Australia and well established in many parts of Victoria in places as far apart as Bright, and Belgrave on the Gembrook line.

Its small but numerous flowers are arranged in dense terminal spikes and are of a bluish-purple hue, hence the name of Purple Top. The lanceolate leaves are sessile and from 1 to 3 inches long, diminishing in size towards the top of stems.

Stock always leave this plant untouched owing to its dry hirsute nature, and it should be hand pulled and burnt wherever found.

Verbena bonariensis is not a proclaimed plant under the Victorian Thistle Act, but in New South Wales it has been proclaimed in several municipalities and shires.

(*To be continued.*)

THE PRE-COOLING OF FRUIT FOR EXPORT.

SOME ASPECTS OF THE QUESTION.

By D. B. Adam, B.Agr.Sc., Department of Agriculture.

When considering this question some persons have been too prone to condemn the system on experience gained from mixed shipments of pre-cooled and non-pre-cooled fruit. Naturally, the latter gains every advantage from the pre-cooled fruit; a steadily falling temperature is much more to be desired than one initially low which rises and is subsequently lowered again, as happens with pre-cooled fruit with the present system of handling.

It is admitted that many shipments under favorable conditions arrive in London in perfect condition, and would not be improved by pre-cooling.

There comes a time, however, when conditions are not favorable, and it is in such shipments that pre-cooling would be of advantage. To make every shipment successful, uniform treatment should be given, and success should not be left to the fickleness of the weather.

Provided fruit is sound and properly handled there are two main factors which determine its successful shipment; these are: (1) temperature of fruit while loading; (2) size of shipment, which may affect its success inversely proportionally to the time taken to load it.

For a successful shipment: (1) if the temperature is low enough, it does not matter about the size of the shipment; (2) if the size of shipment is small, it does not matter what the temperature is, provided of course, it is not unreasonable.

If the temperature be high and the shipment large, failure is more likely.

To analyze this position, we may consider the question of temperature at loading. The most important point to grasp is that fruit picked from the tree is a living organism, it respires or breathes, and as a consequence, produces heat. Respiration and consequent heat production at high temperatures is considerable, this amount can be calculated from experimental data.

When fruit is kept under adiabatic conditions, *i.e.*, where the heat produced is not removed or added by any means, the rate of accumulation of heat at high temperatures is enormous. This feature may be noted on opening a not-iced insulated truck which has been loaded with warm fruit at some country centre, the heat being so great as to cause one to move away from the door and to leave it standing for a while. On no account should warm fruit be placed in an insulated truck unless plenty of ice is used, even then, a louvre, provided it is moving most of the time, is much to be preferred for carriage for any distance.

In order to picture unfavorable conditions for loading, I have taken the *Largs Bay's* maiden voyage.

The maximum shade temperatures on the days this boat was loading fruit at Melbourne, Adelaide, and Fremantle were—Melbourne 89° F., Adelaide 89° F., Fremantle 105 to 107° F. The temperature of the fruit would probably be, in the vicinity of, Melbourne 60° F., Adelaide 60° F., Fremantle 80 to 85° F.

Only a very small proportion of the 100,000 cases shipped was pre-cooled. Every one knows that for good keeping, fruit should be brought to 32° fairly quickly.

Now picture what the engineer has to do when there are, say, 30,000 cases at 68° F., in order to reduce the temperature to 32°.

In the ship's hold, if no heat be removed, how fast would heat accumulate? Experiments and calculation, show that at 68° F. the temperature would be, after 1 hour, 68.2°, after 10 hours 70°, after 20 hours 72.5° F. after 50 hours 82.5°, 100 hours, 125.5° F. After 120 hours fruit would reach its thermal death point.

At 32° we find that after 1 hour it has reached 32.03°, after 10 hours, 32.9°, after 50 hours it has risen to 34°, after 100 hours to 37° F. It takes 400 hours to rise to the same degree as the fruit in the first lot. How much easier it is to control this last shipment?

At higher temperature than 68° it is much faster; at 90° F. the fruit would kill itself in two days' time, under adiabatic conditions.

What has a ship's engineer to do? The main object in designing a ship's refrigeration apparatus is to carry fruit, not to chill the cargo and then carry it. The machinery installed is, in my opinion, insufficient to cope with 30,000 cases loaded quickly and warm, nor was it ever intended to do so. As seen in the figures above, the engineer has not only to reduce from 68° to 32°, the capital, as it were, but he must not allow the interest, or heat accumulating, to mount up. How soon, however, can he do this, especially in the centre of a chamber 60 feet wide, with air at the inlet at a minimum of 30° F.?

"Brown Heart," we are informed, is due to excessive concentrations of carbon dioxide coupled with a deficiency in oxygen. Since carbon dioxide is a product of respiration, its production is increased in the same proportion as was given for heat increase above, this also applies to the diminution of the oxygen supply. The result is that we may find in an unfavorably loaded shipment, "Brown Heart," over-heating and possibly frosting injury due to the anxiety of the engineer to cool quickly the centre of his load to a reasonable temperature.

The size of shipments has greatly increased in recent years. Comparing season 1914 with last year, we find that practically the same amount of fruit was exported in each year although of the 360,000 cases in 1914, about 200,000 went to Germany in German boats. The rest, about 160,000 cases, was taken to London in twenty-three boats, whose shipments averaged less than 5,000 cases each, and last year nineteen boats carried all the cargo to England, averaging 17,000 cases apiece. Certainly, Tasmania used to load as large cargoes as Victoria does now, but the average mean maximum temperature at Hobart is 6° less than Melbourne, and, furthermore, the chance of high temperatures during loading operations is much less than in Victoria, and it is these high temperatures which do harm, as we have seen.

Again, because of the smaller quantity of Victorian produce it was generally used to top the Tasmanian holds, and it thus derived benefit from cool fruit. Nowadays, Victoria has most of the hold to herself, the western States having their fruit put in with Victorian fruit, and thus gaining advantage by radiation and conduction from any fruit which has already been cooled, further delaying the cooling of the centre of the Victorian stack.

What, then, are the remedies? Firstly, if the holds were not opened again until London, it would certainly give more satisfaction than at present. However, if the fruit stored, being of necessity large, for the ship's economy, were about 70° F., the centre would certainly deteriorate, especially if late in the season when the apples are more forward.

Secondly, movable perforated iron columns connected to the suction ducts might be inserted in various parts of the hold, thus diminishing the distance between the inlet and outlet ducts and allowing for more rapid cooling. This method was, I believe, used with satisfaction by certain shipping companies before the war. It is a question of practical consideration whether this addition to the ship's equipment or pre-cooling would be the more satisfactory. Pre-cooling would, at present, necessarily be a matter of Inter-State or Federal action with the possible exclusion of Tasmania. At present the Victorian crop is hardly sufficient to guarantee a full hold for all boats. Those which were not filled could be finished off with pre-cooled South Australian fruit. This allotment of space would necessitate the closest co-operation. Tasmania with her larger bulk of fruit and lower temperature could arrange to practically fill a hold at any time. A small lot could be put in at Victoria if necessary to top it. Adding fruit pre-cooled to the right temperature would be quite satisfactory to all concerned.

Certainly, however, an experiment or experiments on a commercial scale are necessary to fully test the questions. The above, it was thought, would give something to reflect upon.

VITAMINES IN PIG FEEDING.

The first experiment to test the value of vitamines in pig feeding carried out at a recognised Agricultural Experiment Station that we have come across has been conducted at the Iowa station. The experiments were to determine the effects of adding substances carrying vitamines in abundance to the rations of pigs, consisting of maize, meat meal tankage, and salt self fed. The result showed that young pigs, after weaning, receiving in addition a quart of whole milk with 5 oz. of tomato juice, daily for the first sixty days, averaged 80 lbs. at ninety days old, or 25 lbs. more than a similar lot given a quart of milk only per day. This result represented an increase of 45 per cent. in final weight due to tomato juice, and compares with 44 per cent. increase for a similar lot receiving the juice of one orange daily, and with 41 per cent. increase for a further similar lot which received one egg a day instead of the tomato juice or orange juice. These results are decidedly interesting.

—*Live Stock Journal*, 30th June, 1922.

INCREASING THE MILK YIELD.

IMMEDIATE WORK.

By J. S. McFadzean, Senior Dairy Supervisor.

The season is again at hand when a reminder on the above line is opportune. Herd-testing as an essential part of the dairy-farm management is now being given consideration in many quarters, and several associations are actually in work. The testing of pure-bred herds by the Department of Agriculture is also being taken up enthusiastically by breeders.

In its earlier stages this herd-testing movement was not given much thought. The general idea was that it would take up too much time; but as its advantages become more widely known it is being made more use of each year, and with considerable profit to owners. In every new departure there are special points requiring attention, and in this work the outstanding necessity is a continuous supply of green feed.

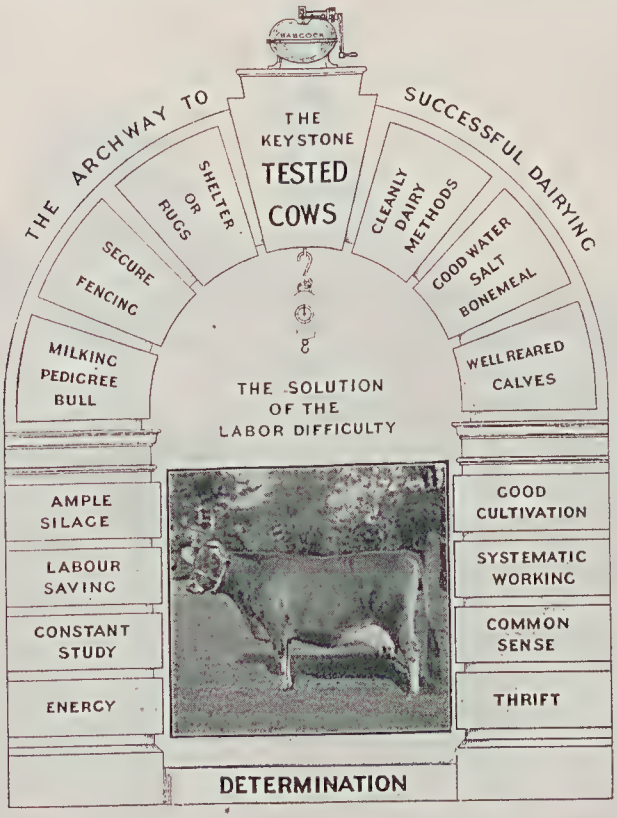
There should be no call to emphasize the fact that green feed is essential to a heavy milk flow. Every one who keeps cows should know that they give most milk when there is an abundance of grass in the flowering and early seeding stage. Whether every one knows this or not, the fact remains that too few make use of this natural condition in the management of their herds. Possibly hundreds of farmers are giving occasional thought to the more intricate problem of a "balanced ration" as a means of increasing the milk production of their herds, but many—very many—of these same people are overlooking the importance of their cows having a constant full supply of green feed.

A sufficiency of green feed for all the cows on every farm all the year round would far more than double Victoria's annual output in butter; therefore this subject cannot be urged with too much persistency. Half-an-acre of land per cow properly worked will keep every animal well fed throughout each year, and the cost of this will not exceed 30s. per cow, while the return will run to several pounds cash per cow according to the dairy quality of each animal. It is a poor crop of oats or barley which will not cut 5 tons of green stuff per acre, and with maize three times this weight will be a very low average estimate under proper cultivation. Again 30 tons of sugar-mangels would be a very medium cropping, and in fact all of these yields are exceeded by a big margin in each dairying district in which they have been tried.

There are successful dairy farmers in every district who work on these lines, and there are ten times as many more who know the value of green food, but who allow their cows to be unproductive over several months of each year for the want of reasonable feeding. Most farmers now recognise that the average land will not grow good crops without some manure or fertilizer. They also know that a half-starved horse cannot lift a full load. So will a poorly-fed cow fall very far short of her possible milk production. To make a test of the milk yield of a cow without having previously supplied abundance of green food from which to make milk is not fair to the cow, and is not likely to be

satisfactory to the owner. Feed them all the green feed they will eat each and every day, and cows will soon show their quality as milkers.

Cows which are insufficiently fed at any season will never put up their best yearly production. If they are out of condition in the spring through want of feed in the winter they take time to re-condition before they milk to their best. If there is not a full supply of green stuff for them right through the summer the yield will drop, and not recover again till the following calving. Only by a full and unbroken supply of green feed can cows be kept at their full milking limit, and to test them when on short rations is sheer waste of time.



As already stated, the spring grass is at its best for milk production when in the flowering and early seeding stage. The feeding quality of sappy green stuff can most easily be improved by the addition of a proportion of bran, crushed oats, lucerne chaff, or other more concentrated food, which will make up the value of the grass seed or cereal seed which is absent in the green stuff. When the feeding of the dairy herd has reached this stage, and there is a continuous supply in sight, the owner may give time to the study of a balanced ration as a means to further improvement; but there are few indeed in Victoria who have reached that commendable stage.

Consequent on the publicity which has been given to the advantages of irrigation, many people have come to consider that in the absence of such facilities they are unfavorably situated for dairying; but the fact is that many of the best feeders of dairy cows in the State are not on irrigation land. Apart from the irrigation areas there is actually no better country in the world for dairying than Victoria. Soil, climate, and rain distribution contribute to this, and make

Maize for Fodder.

dairying profitable without irrigation. Where there is no water for the irrigation of a permanent lucerne crop, tares are grown to take the place of this fodder; and when sown with a cereal crop tares improve its feeding value either as green stuff or hay, as well as increasing the bulk yield per acre. Mangels, pumpkins, and maize are all

widely grown without irrigation, and very heavy returns per acre are obtained.

Owing to the immense bulk that can be harvested from each acre, and its suitability for fodder at any stage of its growth, as well as the short period it takes to mature, maize stands out as the king of fodder crops. It is easy to grow and more easy to conserve as silage than any other crop; and taken all round it is a good milk-producing fodder, especially when seeding.

The Department of Agriculture is still advancing money for silo building on three years' terms, and under this system a silo will always have more than paid for itself before the payments are due. Eighty tons of silage represents 160 days supply of succulent fodder for a herd of 20 cows, and as the silo should be filled in the early summer with a cereal crop to use during the drier months, and again in the autumn with maize for winter feeding, an 80-ton silo will come close to keeping the average herd continuously supplied with succulent feed throughout the whole of the year, and the milk yield retained at its limit.

Ample green fodder makes profitable dairying a certainty. With good feeding cows will either milk well or fatten, according to their constitution. Without good feeding a cow will neither milk well or put on condition, and so no estimate can be made of her value. Now is the time to begin. A full supply of green feed for the herd at once opens up the way to profit through the cows producing either milk or beef. The method is simple in the extreme; and the wonder is why so many farmers should continue to work for only half their possible profit when full returns are so easily obtainable for the cows.

At this present date the first step to be made would be to order a silo from the Department or to see about getting one built privately. Application to the Chief Veterinary Officer, Department of Agriculture, Melbourne, will bring full information.

If the herd is a small one of about ten cows it may be possible to get through the year without a silo, if mangels, maize, and pumpkins are grown for autumn and winter feeding; but with a larger herd in the drier areas silage is a necessity.

Where land already broken up is not available for planting, an acre for mangels and another for the first sowing of maize should be prepared without any loss of time. That for the mangel crop should be extra well worked to give an even seed bed. Unless farm-yard manure is available in well-rotted condition, both mangels and maize will be improved by a dressing of superphosphate and bone-dust at time of sowing. Manure from poultry yard, sheep yard, or short stable manure broadcast over the drills after sowing will also be useful, as such manure works in when the crops are being hoed.

With both mangels and maize a more even germination of the seed is obtained by soaking it for two or three days prior to sowing, and it can be afterwards left to drain, covered over with a damp bag for a few more days without injury. Both these crops are best sown in drills 3 feet apart, so that the land between the rows can be worked with a horse hoe and the weeds kept down. These hoeings should

only break the surface, otherwise, with maize especially, the roots may be injured. Also in the rows the seed should never be closer than at 6-inch spaces. Each mangel seed usually produces three plants which have to be thinned out later, the strongest plant being left. Later on, if the crop promises well, the plants can be thinned out again so as to leave them 12 to 16 inches apart in the rows. The lower leaves of the mangel crop can always be used if other green fodder is scarce, and pigs, and poultry, and cows do well on them. From 1 inch to 2 inches is the full depth that mangels can be planted with safety, the latter being the depth required in loose or sandy soil. Maize does not require to be put in deeper than 3 inches. Care should be taken that the soaked seed is not allowed to dry at all before being covered with the soil after sowing.

The main object in this work is to get a portion of the crop sown as soon as possible, and the bulk sowing of maize should follow immediately. In either early or late sowings of any crop there is always some little risk, and several small sowings are usually better than one large one, unless very favorable weather conditions occur. Every half-acre of barley and tares, or oats and tares, that is sown should supply some 250 feeds of good green stuff, and at least three times this quantity if the crop is of maize. Even a half-acre sowing may thus go far to upholding the milk yield of the herd at a critical time. Such small catch sowings may therefore easily make a big difference in the cash returns of any season.

It is by these successive sowings that the supply of green fodder is well maintained. With such provision herd-testing can reasonably be carried out, and by continuous green feeding the dairy work will be made fully profitable.

PROPAGATION OF ENGLISH HOLLY.

The common English holly is propagated from seed sown in light soil in pans or boxes, or in sheltered beds in the open ground. The berries are collected as soon as they change colour in May or June, and dried on a tray in the sun. They are then placed in a close-fitting tin, with a dusting of fresh lime on them to keep away seed weevils. The sowing is made as soon as the ground becomes warm again in late spring. The seedlings are transplanted in rows as soon as they are large enough to handle, and planted in their permanent positions when 9 to 12 inches high.

CASSE.

WINE DEFECTS NOT DIRECTLY CAUSED BY MICRO-ORGANISMS.

By F. de Castella, Government Viticulturist.

(Continued from page 490.)

Other Forms of Casse.

As previously pointed out above, there are other forms of Casse besides brown, blue, and white. Critical examination of what is known concerning them is, however, disappointing. We are entering on ground which has been less thoroughly explored, and where much is conjectural. Literature on the subject is scanty, and information somewhat indefinite. There is here a vast field for research work. The following forms are of most importance:—

Potassic Casse.—A curious form of Casse has been described by several French authors, notably Martinand and Laborde, under the above name; a form which is perhaps more frequent than is generally realized in our full-bodied dry red wines, so largely shipped from Australia to England. The points of resemblance of this form to blue Casse, and the reduction of colour and body caused in some wines has been referred to on page 483 of August issue.

Martinand* first drew attention to this defect in connexion with some wines of 1904 vintage, which, though gathered under fine weather conditions, and free from contamination by the Botrytis Cinerea fungus, nevertheless yielded many wines liable to a change not unlike brown Casse.

Analysis of such wines reveals the peculiarity that the ash is more alkaline than the tartaric acid content (free and combined with potash) would lead one to expect; there was thus an excess of potash. An excess too considerable to saturate the acids of the wine capable of displacing tannin from its combinations. Under such conditions the compounds of tannin and colouring matter with potash, have permitted the atmospheric oxygen to combine with the iron contained in the wine, forming sediments of a violet or blackish colour, in the case of wine made from Petit Borschet, and of a yellow colour with Aramon and similar grapes which do not contain much iron.

Such changes are not prevented by heating to 100 deg. C., even if repeated after an interval of 24 hours; hence neither micro-organisms nor enzymes can be the causative agent. Martinand infers that apart altogether from enzymic, bacterial, and aldehydic forms of Casse there exists another alteration, really due to the oxidation of tannin and colour in wines unduly rich in potash.

Such a change is emphasized by the presence of mycoderma vini and M. aceti. It is certainly slower in their absence. Martinand recommends a twofold treatment as follows:—

1. To precipitate the potassic compound of tannin and colouring matter by heavy fining with gelatine or albumen, followed by acidification.
2. To sulphite heavily at vintage time, grapes liable to this trouble.

* *Revue de Viticulture*, 21st September, 1905.

Laborde* corroborates Martinand's earlier observations, agreeing that in wines thus liable, a certain proportion of their tannoid constituents are combined with potash, and in this condition they are more liable to oxidation than in the free state. He refers to the difference between potassic and blue Casse, the wine becoming yellow in the former case.

It must be remembered that the soils of some of our wine districts are remarkably rich in potash—an excess of this element in the wine would thus seem to play a part, not dissimilar from that of the soda one adds to the pyro in a photographic developer; this rough comparison may be permitted in view of the fact that pyrogallol and tannin are kindred substances; the former is, in fact, a derivative of the latter.

Bacterial Casse.—Certain forms appear to be due to bacterial action. Some authorities hold that these organisms can secrete oxydase. Many bacteria produce aldehydes, and it is not clear whether the transformations classed as bacterial casse are due to enzymes or aldehydes. Possibly both play their parts in changes which have been summarily described and not thoroughly investigated. This form constitutes a connecting link between the casse group and wine diseases caused directly by bacteria.

Aldehydic Casse.—The addition of little more than a trace of formol to a normal red wine will immediately induce the symptoms of brown casse, such as clouding, breaking of colour, and the formation of an iridescent surface film. Ethyl aldehyde acts in a similar way, but more slowly and less acutely. Permanganate of potash and other oxydizing agents bring about similar changes.

Aldehydes are normal constituents of wine, especially of old wine. They are also secreted by bacteria and other organisms, notably *Mycoderma vini,* and probably also by the "flor" organism which plays so large a part in the rearing of "fino" sherries. There seems little doubt that aldehydic action plays a large part in the development of wines of sherry, port, and rancio types, possibly a larger part, also, than is generally admitted, in the normal maturation of wines of lighter types.† This phase of the question will be dealt with later.

Mousiness.—This curious and very obnoxious taint, which seems peculiar to Australia, since no similar term exists in any French vocabulary of wine defects, is, in my opinion, of enzymic nature. What the causative agent is, where and how it originates, are problems awaiting solution. Like casse, mousiness only develops on exposure to air. It is also amenable to treatment by sulphurous acid. Distinctly mousy wines treated with SO_2 at the rate of 3 centigrammes per litre usually lose the taint after a few months. It does not appear to be of bacterial origin. I have known pure yeast cultures to become very mousy. These consisted of sterilized grape juice, inoculated with the pure yeast, and which, under the microscope, showed no trace of bacterial or other contamination.

Mousiness is still somewhat of a mystery, the solution of which would be a great boon to Australian wine makers.

* *R. Vit.*, 18th November, 1909.

† See J. Laborde, *R. Vit.*, April, June, July, and August, 1918—Investigations on the ageing of wine.

Normal Maturation of Wine.

In the foregoing pages the relationship between normal maturation and certain manifestations of casse have been referred to. It will not, therefore, be out of place to briefly outline the changes which take place during the ageing of wine.

Since the earliest times it has been known that wine improves with age. Concerning the nature of the changes responsible for such improvement, however, little has been known until comparatively recently. The time which must elapse for the development of the highest measure of quality varies very considerably from a few months in the case of *vin ordinaire,* the household beverage of France, to many decades for a high class Madeira. Claret is usually bottled when five or six years old, and continues to improve for 20 to 30 years according to the vintage. Burgundy matures more rapidly; it is usually bottled when two to three years old, and is at its best seven to ten years later.

There are two distinct stages in the maturation of a wine—cask age and bottle age—to each of which corresponds a distinct class of chemical changes. The first are mainly oxydation phenomena; the second consist in the formation of esters. It is true that esters are also formed in the cask, especially on lengthy storage.

Another fact well known by all cellarmen is that unless kept in vessels which are regularly filled up the wine, especially if light, soon becomes pricked or unsound, ultimately turning to vinegar if exposure be sufficiently prolonged. Air was thus looked upon as the cellarman's greatest enemy.

Prior to 1866, beyond these few facts, little was known on the subject. In that year Pasteur* published his work on wine, the result of two years of research, undertaken at the suggestion of the French Emperor Napoleon III. in 1863.

This remarkable work forms the basis of our present knowledge on the subject. Though later investigators have added to it they have invariably confirmed all that Pasteur wrote more than half a century ago. The ideas then expressed were not only novel, but also revolutionary, since it was shown for the first time that far from air being the enemy of the cellarman it is the main factor in developing the quality of wine. Thus new ideas are set out in the second part of the work under the heading "of the influence of the oxygen of air in wine making."

Pasteur mentions Boussingault's earlier investigations, and his observation that wine contains no dissolved oxygen, but only nitrogen and carbon dioxide, the natural inference being that wine contains highly oxidisable principles. Berthelot confirmed these facts, and was, according to Pasteur, the first to ascribe to its true cause, viz., the absorption of a certain quantity of oxygen, what is known in French as *event,* a word which has no English equivalent, and which means the flatness or staleness (apart from unsoundness), which wine develops on ullage; usually a transient and not a fatal defect. He also quotes Batillat, who in 1846 summed up the then prevailing opinion when he wrote, "There is no good wine in a vessel that is not full."

* L. Pasteur, Etudes sur le Vin, ses Maladies, Causes qui les Provoquent, Procédés Nouveaux, Pour le Conserver et Pour le Vieillir, 1866.

Pasteur explains that he also has studied the relations which can occur between atmospheric oxygen and wine in its different manipulations. He recognises the correctness of the observation of previous investigators and the soundness of several of the practices devised to prevent contact with air, and explains that, "I have, however, been led to view the subject from a new stand-point which I believe is a truer one."

After again quoting Berthelot, who wrote, "My observations prove with what care wine, once it is made, should be preserved from the action of air, since the prolonged action of 10c.c. of oxygen, *i.e.*, 50c.c. of air, suffice to destroy the bouquet of a litre of wine."

Pasteur continues, "But the question is more complex, and I may add, more important than has been thought until now. . . . I have been led to consider this gas (oxygen), not as harmful, but as very useful to wine. According to my view it is oxygen that *makes* wine; it is through its influence that wine ages. It is oxygen that modifies the crude (*acerbes*) principles of new wine, and causes the disappearances of its bad taste; and, further, that provokes sediments of desirable nature in cask and bottle, and far, for example, from an absorption of a few c.c. of oxygen per litre 'wearing' the wine, destroying its bouquet and weakening it, I believe that a wine has not arrived at its quality, and should not be bottled, until it has absorbed a quantity of oxygen much superior to this."

"How explain these contradictory observations? It is necessary to very carefully distinguish between sudden and slow action of atmospheric oxygen on wine. Furthermore, it is not difficult to prove that cellar practices, though seemingly so opposed to the introduction of oxygen into the wine, are eminently suited to submit this liquid to a progressive slow oxydation, whilst at the same time opposing a sudden (brusque) and prolonged aeration. I will even add that, were it not necessary to be constantly armed, in the handling of wine, against the diseases to which it is subject, there are many practices in the art of wine making which would be abandoned because they exclude the oxygen of the air." . . . . .

"Even *event* of wine should, itself, be more critically considered than has been done. It is quite true that ullage weakens wine, but I have noticed that this effect changes much with time, if the wine having become flat (*eventé*) is enclosed and kept from contact with air in full bottles. *Event* constitutes thus a kind of change which does not last with anything like its original character, a fact which helps one to realize the great difference which must exist between sudden and slow aeration of wine."

Experiments to determine the gases present in solution in wine are described in detail, the conclusions arrived at being—

"1. That neither new nor old wine contain a trace of free oxygen in solution.*

2. That new wine only contains pure carbon dioxide (carbonic acid).

3. That old wine contains much less carbon dioxide than new wine, and also nitrogen, in appreciable quantity."

* Only immediately after 24 hours' exposure in a shallow glass dish or after energetic shaking with air does wine contain oxygen in solution. After a day's rest this free oxygen has disappeared. Pasteur, idem, pp. 100 and 103.

Pasteur shows that the presence of flowers of wine (*mycoderma vini*) on the surface prevents the solution of oxygen by the wine, owing to the remarkable avidity for oxygen of this micro-organism. He resumes the question, and points out the advisability of moderate aeration. "We thus see that grape must and wine are very remarkable liquids, considered in their relations with oxygen. They are always exempt of free oxygen, because they are very oxidisable, and consequently always ready to withdraw from air a certain proportion of this gas. It is impossible to expose wine to contact with air without its dissolving oxygen, which soon disappears, so that solution and oxidation can recommence unceasingly."

It is to Pasteur that we owe the explanation of the important part played by the porous envelope constituted by the wood of the cask in the first stage of maturation, that of cask ageing. After pointing out how every cellar manipulation tends, more or less to aerate the wine, he continues—

"But of all these usages, the most considerable from this standpoint is undoubtedly that which consists in storing the wine in casks of oak wood. The walls of a wooden cask permit active evaporation, variable with the thickness of the staves, with the nature of the wine, and, finally, with the cellar, its aspect, its temperature, and the distribution of its air currents. The interior ullage resulting from this evaporation, at the wooden surface, is necessarily replaced by air, the oxygen of which disappears on contact with the wine." The ullage of the cask being known an idea can be formed of the quantity of oxygen absorbed by the wine, even thoroughly bunged and abstraction made of any exposure to air in racking—

Interesting particulars are given of the waste through evaporation in the Burgundy cellars, where the choicest wines are stored, either in large casks or more usually in 228 litre (50 gallon) hogsheads, always of new oak wood. The wine is racked three times the first year (March, May and September), and twice a year during the following two years (June and October) the wine remains in wood on an average four years. The ullage in a 228 litre hogshead is not less than ¾ litre every 25 days in the Burgundy cellars. This applies to the first year during which the new and more porous wood permits more active evaporation; after two years the ullage is reduced to ½ litre per 25 days or 10.5 litres a year. On this basis, during three years storage the ullage would amount to 35.5 litres, equivalent to more than 30cc of oxygen per litre for the three years to which must be added the oxygen absorbed in racking. This is, however, slight in Burgundy cellars, where racking is habitually practised without exposure to air.

Experiments are described which prove "that wine does not age if kept in such a way as to avoid contact with air." The inference is drawn, "That the changes . . . expressed by the term ageing . . . must be mainly attributed to the absorption of oxygen and the liberation of the greater part of the carbonic acid with which the wine is supersaturated at the first racking."

"The use of wooden casks . . . which leads, as shown above, to slow but appreciable aeration . . . is rendered necessary, much more by conditions of ageing of the wine than by the convenience which this class of vessel may present for its storage."

"Impervious vessels of glass or earthenware would be unsuitable. In such the wine would remain 'green' unless very frequently racked."

The question of painting the outsides of casks, a practice followed in some Burgundy cellars, also receives attention. This has a result of keeping

the wine fresher and greener, and I hold that wine stored in such casks should be bottled a year or, perhaps, two years later, other things being equal, than the same wine stored in an ordinary cask.

The proper moment for bottling is of great importance. "Wine must be slowly aerated in order to age it, but the resulting aeration must not be carried too far. It would weaken the wine too much; it would 'wear' it; it would deprive red wine of nearly all its colour. There thus exists a moment variable for each sort of wine (and for the same sort with the vintage) at which the wine should pass from a porous to an almost impervious vessel."

It is not possible to here describe the now classic experiments with wines in sealed tubes with and without exposure to air, in darkness and in sunlight. In sealed tubes without air no maturation took place. On the contrary, striking changes occurred when aeration was abundant (sealed tubes only half full). "The wine finally losing its original flavour, ageing beyond measure, and developing in an extreme degree, the taste of Rancio wines, in the case of a red wine or a Madeira taste in that of a white wine."

The flatness (*event*) resulting from aeration, if not pushed too far is, however, temporary. If the wine be subsequently kept in full-sealed vessels considerable changes occur, usually favorable to quality. The full influence of oxygen is not immediate. "The first influence of oxygen is not the durable influence; it is not that which will be observed after a certain time if the wine is preserved from further oxidation. Thus is certainly explained the need to allow newly bottled wine to rest before its quality can be judged."

In these sealed tube experiments, aeration was more drastic than under normal cellar conditions. "A few weeks exposure to air and sunlight produced the action of ten to twenty years in cask. Naturally a wine, aged and caused to develop a bouquet thus rapidly, has not the identical quality of a wine matured 20 or 30 years in cask; nevertheless the changes are of similar nature." I repeat, all these profound changes which it takes ten to twenty years to obtain in Jura, and two or three years at Cette, can be brought about in some weeks by the direct effect of atmospheric oxygen.

"The combination of oxygen with wine is thus, it seems to me, the essential act in the ageing of wine."

Before leaving the subject Pasteur deals with the well-known action of a sea voyage in maturing a wine—"I am persuaded that the changes must be attributed far more to the action of oxygen than to increase in temperature. Two circumstances favour the introduction of oxygen during a voyage to the Indies or to America: more rapid evaporation at the surface of the staves, and especially the shocks of the liquid against the walls (sides of the cask) acting less by agitation than as the cause of sudden and unceasingly repeated variations in internal pressure, whence result an expulsion of nitrogen and carbonic acid, and an entry of air through the pores of the wood, far more active than in case of a wine being left at rest in a cold cellar."

Though Pasteur made it perfectly clear that maturation of wine, especially in the cask, is essentially an oxidation process, he is less definite concerning the substances which are thus oxidized. Colouring matter is, however, frequently mentioned. Thus on page 82, "There

exist in grape must . . . principles as yet imperfectly known which have extreme avidity for oxygen, and which combine directly with it. These principles are certainly multiple, already in must, and *a fortiori* in wine, where are to be found, in addition, the colouring matter of the skins, itself very avid of oxygen.

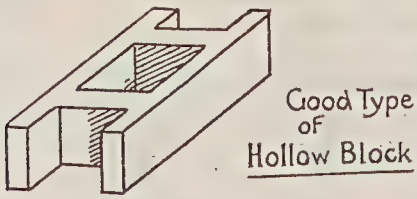
Again (page 118) dealing with the behaviour of wine in half-filled sealed tubes. "Though the colouring matter of red wine and a similar matter in white wine, feel the effects of oxygen in most marked manner, it must not be thought that oxygen does not also act on other principles. The phenomenon is most complicated. I have noted in tests, several times repeated, that part of the acid seemed as though burnt." A case is mentioned of a wine which thus lost 12 per cent. of its total acidity. Sugar seemed to undergo a similar reduction. "Interesting studies might be made in these directions."

(To be continued.)

CONCRETE BLOCKS FOR BUILDING PURPOSES.

The advantages claimed for this form of building material are—

1. Cheapness compared with other fireproof building material.
2. It is possible to make blocks in almost any shape.
3. Good insulation (hollow blocks).
4. Low labour cost. Blocks are laid rapidly and with less mortar than bricks.
5. It is claimed that properly constructed walls of concrete blocks are stronger than walls of equal size made of brick or stone.



Manufacture of Blocks.

A fine aggregate and a rather rich mix are required for satisfactory work.

In solid blocks it is permissible to use aggregate up to 2 inches or 2½ inches, provided sufficient finer aggregate is used also.

In hollow blocks, the thickness of the wall is seldom greater than 1½ inches, therefore aggregate from ½ inch to ¾ inch should be used.

To prevent ingress of moisture rich, dense mixture should be used.

Interior partition walls may be made of leaner mix and, if available, cinders may be used instead of stone aggregate.

For exterior walls gravel or broken stone should be used.

Where sand only is used for the aggregate, the mixture may vary from 1 to 3 to 1 to 6 (that is one part of cement to from 3 to 6 parts of sand).

When stone and sand are used, the proportions should be 1, 2, 4, or 1, 3, 5 (1 cement, 3 sand, 5 stone).

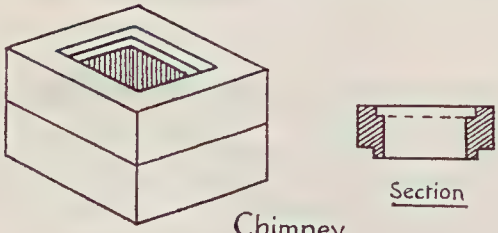
There are three methods of making the blocks.

1. *Tamping.*—A dry mix is used. Placed in mould and tamped. Then, when sufficiently hardened, the block is removed and stored under cover until cured. The blocks *must* be kept moist and protected from sun, wind, and frost until thoroughly cured. The blocks should be covered with wet bags, and the bags moistened from time to time for a fortnight. This curing must not be neglected, as often an entire wall has failed through the failure of one or several of the blocks.

2. *Pressing.*—When blocks are pressed, the mixture should be more moist. The blocks should be cured as above.

3. *Moulded.*—A wet mix is used and the blocks are left in the mould for several hours. Curing is necessary.

Sometimes blocks are moulded "face" downwards. The bottom layer may be made of rich mix and a backing of leaner concrete used. Thus a waterproof face is obtained.



Advantages of Solid Blocks.

Hollow blocks undoubtedly have advantages over solid blocks—

1. Insulation.
2. Lighter to handle.
3. Saving of material.

Special chimney blocks may be made as in sketch.

Laying.—Concrete blocks should be laid with as thin mortar joint as possible. Cement mortar 1 to 2 or 1 to 2½ should be used.

Sufficient blocks should be prepared before commencement of work. Special blocks for window sills, &c., should be prepared in advance.

A footing for a foundation wall is necessary as with a brick building.

Plastering may be done directly on inside face of blocks. If the blocks are porous this is not advisable. In this case furring strips are used, and the usual lath and plaster method adopted.

Walls for one-story building are usually made 8 inches thick.

Lime Concrete Blocks.

The use of lime concrete for the blocks is not to be recommended. Lime mortar bricks have seldom given satisfaction, owing to their lack of strength and to their porosity. The difficulty of rendering them waterproof should be considered.

Screened gravel is to be preferred to limestone for the aggregate, but the latter should prove satisfactory. In the absence of samples this cannot be definitely stated.

It is most important that the sand and aggregate should be clean and free from impurities, and that clean fresh water should be used for mixing.

WORLD'S POULTRY CONGRESS.

(Continued from page 436.)

By A. V. D. Rintoul, N.D.D., Chief Poultry Expert.

Polyneuritis Among Fowls.

Professor Dr. L. De Blieck dealt with this trouble, explaining that so far as fowls were affected this was generally due to a deficiency of vitamines. The symptoms were similar to those of beri-beri in man. The symptoms usually noted are, first—ataxia—the animal walks briskly, but particularly when changing direction slips sideways, the walk gradually becomes spasmodic, paralysis increases, and vitality rapidly declines. A dose of from 1 to 2 grammes of yeast is considered to be the best possible treatment, and the trouble is usually found to occur amongst birds closely cooped up in the neighbourhood of towns.

Abscess of the Feet in White Leghorns.

Dr. B. F. Kaupp, of North Carolina, described the trouble commonly known as "bumble-foot" as being most prevalent amongst "the more delicate breeds, as the leghorns." In all cases investigated a pure culture of a similar organism was obtained, *i.e., Staphylococcus pyogenes aureus.* Bruising the soles of the feet, as by jumping from perch to floor favours abscess formation when the pus-producing organisms are present. Lancing the abscess, and curetting out the cheesy pus, followed by swabbing the cavity with pure iodine is found to be the most successful treatment.

Vaccines for Poultry.

Dr. Camillo Ferni pointed out that Pasteur's original experiments were made on the bacillus of chicken cholera by weakening the virulence through the action of atmospheric oxygen, so as to produce an inflammatory local reaction at the spot of inoculation where the bacilli possessing a reduced virulence, multiply while invading a part of the tissues, but are at the same time attacked and destroyed by the phagocytes before having determined the general infection. When the local inflammatory process is cured, the fowls remain immune from the lethal dose of a virulent culture. Pasteur's method for the vaccination of fowls against chicken cholera remains the classical process with which a permanent immunity for two years or more is assured. The inoculation is done with an ordinary syringe under the skin at the spot where the neck joins the back.

What is being done to Improve the Poultry Industry in Various Countries.

The Fourth Section of the Congress dealt with the training and necessary qualifications of poultry instructors, education, and demonstrating work. In Great Britain, Europe, and America regular courses

in poultry culture are held for the purpose of training future instructors, examinations are held, and diplomas or certificates issued. The first college professor of poultry culture at an American college was appointed in 1906, the salary being 2,500 dollars a year. Forty-two out of the 48 States in America now offer poultry instruction at their State colleges or universities.

In Great Britain the practice has been for the various county councils to employ an itinerant lecturer, at first on the basis of a fee per lecture, or series of lectures. Later on, some of the agricultural teaching institutions began to provide more or less regular instruction in poultry keeping, and by degrees small poultry plants commenced to make their appearance at the agricultural teaching institutions.

The supply of competent teachers was extremely small. Not only had there been no training school to provide teachers, but there had been no experimental or investigation work done upon which to base teaching. In view of lack of trained teachers, the Board of Agriculture in 1894 organized a course of poultry instruction at Leeds University, and in the same year University College, Reading, commenced to provide instruction. In 1899 the first poultry training and experimental station was established at Theale, near Reading, by Mr. Edward Brown. Short courses of three weeks' study were gradually extended in 1901 to ten weeks, and by 1907 they were further extended to twelve months' duration. In thirteen years over 500 students had undergone training, coming from practically all parts of the world.

At the present time 51 county councils employ 57 whole or part time instructors, who secure an average attendance of about 35 persons per lecture. Seeing that in 1919 Great Britain imported eggs and poultry to the value of £35,000,000, the necessity for poultry instruction is obvious.

A national poultry council has now been formed, and a national diploma in poultry keeping is now being awarded by examination on similar lines to the national diploma in agriculture and the national diploma in dairying.

Education in poultry keeping has been provided for over 20 years. Ireland is essentially a country of small farms. Out of a total of 572,000 holdings, some 400,000 are of not more than 30 acres in extent, and of this number 114,000 are of not more than 1 acre. People who are willing to keep a pure breed of fowl, say, 30 hens and three males, and are willing to distribute therefrom 70 sittings of eggs in the year are given a grant of £9.

There is also an Irish national egg-laying competition for pens of six pullets, the average number of eggs per bird in 1913 being 120, rising in 1920 to 186 eggs per bird. The profit over feed per bird in 1913 was 5s. 7d., and in 1920 was 34s. 5d. Twenty years ago the total value of the poultry industry in Ireland was less than £4,000,000. Now it is worth no less than £24,000,00, as compared with under £10,000,000 for butter and cheese, and about £8,000,000 for pigs, bacon, and hams.

STALLION REGISTER, 1922-23,

under the "Horse Breeding Act 1919."

(Part I.—Registrations prior to 12th July, 1922.)

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
122	Abbot's Pride ..	A	Draught ..	W. H. Gadd ..	"The Glen," Wodonga
574	Aberdeen	A	Light ..	John Troup ..	Coghill's Creek
12	Ace of Spades ..	A	,, ..	C. Lippiatt ..	Scotsburn
575	Active	A	Thoroughbred	G. Brown ..	Bennison
192	Admiral Speary ..	A	Draught ..	C. Hill ..	Gama
156	,, Sperry ..	A	,, ..	A. Duff ..	Baringhup
188	,, Wood ..	A	Light ..	A. G. Hunter ..	Elmore
290	Advance	A	Draught ..	A. W. Brown ..	Speed
509	Aird Laddie ..	A	,, ..	E. Yeaman ..	P.B., Echuca
366	Albert Dale ..	4	,, ..	Vaughan Bros. ..	524 Collins-st., Melbourne
69	Albion	A	,, ..	Jas. Oakes ..	Nathalia
70	Al Borak	A	Light ..	L. Bennett ..	Nullawil
317	Alex. R.	A	,, ..	C. L. Lutze ..	Long Plain, *viâ* Sea Lake
103	All Black	A	,, ..	W. Morey ..	Katandra Nth.
510	,, Scotch ..	7	Draught ..	Elliott and Dickens	Corowa, N.S.W.
104	,, Style	A	Light ..	R. Matchett ..	Bendigo
511	Almont M. ..	A	,, ..	J. Minns ..	Melton
13	Almont's Pride ..	A	,, ..	Downie Bros. ..	Longwarrys
576	Amborshine ..	A	,, ..	L. A. Gunsser ..	Ballarat
14	Amberstain ..	A	,, ..	J. L. Cumming ..	Berrimal
577	Angle Jack ..	A	,, ..	C. F. Hillas ..	Tallangatta
439	Argyle	A	Pony ..	R. Trimble ..	Rutherglen
440	Astor	A	Light ..	A. Grant ..	Meredith
388	Attractions Champion	A	Draught ..	W. Morley ..	Rutherglen
318	Avonlea	7	Draught ..	Jas. Leitch ..	Wodonga W.
15	Axedale Prince ..	6	,, ..	J. McDonald ..	Barrakee N.
242	Bally Bells ..	4	Light ..	N. W. Clements ..	Baxter
16	,, Golly ..	A	Pony ..	T. C. Maidment ..	Moyston
349	Bannockburn ..	A	Draught ..	G. W. Francis ..	Lower Norton
291	Barney II. ..	A	Pony ..	A. W. Thomson ..	Hamilton
71	Baron	A	Draught ..	M. Murphy ..	Rupanyup
449	,, Asquith ..	A	,, ..	J. Hall ..	Jamestown, Sth. Aus.
2	,, Belmain ..	3	,, ..	L. J. King ..	Quambatook
72	,, Clyde ..	A	,, ..	Cunnington Bros.	Bamawm
436	,, Crombie ..	5	,, ..	A. P. Johnston ..	Colbinabbin
513	,, Faithful ..	A	,, ..	D. Barry, junr. ..	Culgoa
508	,, Favourite ..	4	,, ..	W. Bodey ..	Dooen
194	,, Fenwick ..	A	,, ..	H. C. Wilson ..	Raywood
452	,, ,, ..	A	,, ..	A. J. Richards ..	Strath Creek
248	,, Gleniffer ..	6	,, ..	S. J. Lynn ..	Orbost
441	,, Juno ..	A	,, ..	Manifold and Co.	Camperdown
249	,, Laddie ..	A	,, ..	A. McLennan ..	Derrinal
195	,, Leigh ..	A	,, ..	Meer Khan ..	Modewarre
296	,, McKie ..	A	,, ..	J. A. McDougall	Cosgrove
580	,, McLeod ..	A	,, ..	David Mitchell Est.	Lilydale
514	,, Milford ..	A	,, ..	Jas. Johnstone ..	Lubeck

STALLION REGISTER, 1922-23—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
578	Baron's Heir ..	A	Draught ..	T. J. Hansen ..	Barnawartha
515	,, Idol ..	A	,, ..	J. Carmichael, jun.	Burramine N.
17	,, Pride ..	A	,, ..	V. J. Lanfranchi	Cowangie
196	,, Reserve ..	A	,, ..	E. J. McCabe ..	Gerang
197	,, Royal Chief	A	,, ..	T. E. Parry ..	Coonooer Bridge
389	Baron Stanley ..	A	,, ..	Graham Bros. ..	Bacchus Marsh
73	,, Stewart ..	A	,, ..	J. W. Hansen ..	Baulkamaugh North
3	,, Style ..	4	,, ..	A J. A. Browne	Werribee
198	,, Twist ..	A	,, ..	E. W. and W. S. Ham	Pannooba-mawm
442	,, Watson ..	A	,, ..	Manifold and Co.	Camperdown
443	,, Weerite ..	6	,, ..	Manifold and Co.	Camperdown
74	,, Wigton ..	A	,, ..	Dept. of Agric., State Research Farm	Werribee
18	Barony	A	,, ..	G. McVicar ..	Avoca
579	Battarlons ..	A	Light ..	T. Skelly, jun. ..	St. Arnaud
159	Bawnmoor ..	A	Thoroughbred	Jessa Singh ..	Nyarrin
453	Bay Harold ..	A	Light ..	A. Sutherland ..	Boneo
199	Beacorsfield Flyer ..	A	,, ..	T. J. Scott ..	Everton
193	Beau Brummel ..	A	,, ..	John Scott ..	Neilborough
516	,, Cheval ..	A	,, ..	T. Garland ..	Sandy Creek
160	,, Gallant ..	A	,, ..	J. Dunlop ..	Birregurra
251	Belmont's Champion	A	Draught ..	Goss Bros. ..	Donnybrook
500	Berkeley Bantam ..	A	Pony ..	R. Crozier ..	South Morang
202	Bismarck ..	A	Light ..	H. J. Manthorpe	Inglewood
255	Black Prince ..	A	Pony ..	Thos. Gaudie ..	Thoona
390	Black Tom ..	A	Light ..	A. Potter ..	Nareghid
146	Blue Wilkes ..	A	,, ..	J. McNeill ..	Weering
252	Bobby	6	Pony ..	Geo. Officer ..	Woolsthorpe
319	Bobniak	A	Light ..	H. F. Clarke ..	Miepoll
321	Bold Acton ..	A	Draught ..	E. Pearce ..	Rupanyup
581	,, Agitation ..	A	,, ..	Chamberlain and Ritchie	Morwell
295	,, Briton ..	A	,, ..	C. A. Schulz ..	Lake Hindmarsh
7	,, Captain ..	3	,, ..	T. Parker ..	Pepper Plains
584	,, Lad	A	Pony ..	J. W. Smith ..	Elmore
367	,, MacGregor ..	A	Draught ..	W. McNaughton	Walpeup
454	Bonnie Direct ..	A	Light ..	W. T. Taylor ..	Merbein South
392	,, Brae ..	A	Draught ..	King Bros. ..	Kinnabulla
369	,, Doon Junior	A	Pony ..	A. E. Davis ..	Omeo
588	,, Wizard ..	A	,, ..	J. Fitzpatrick ..	Numurkah
256	Bon Wickliffe ..	A	Light ..	J. Ford ..	Wickliffe
75	Bower Bank ..	A	,, ..	J. O'Bree ..	Piangil
322	Bramhope Forester	A	Draught ..	E. Parish ..	Horsham
455	,, Monarch	A	,, ..	G. Hicks ..	Miram
19	,, Paladin	A	,, ..	W. H. Alford ..	Modewarre
393	,, Parthian	A	,, ..	C. L. Renfrey ..	Drysdale
162	,, Samson	A	,, ..	A. Dean ..	Tinamba
456	Breastknot ..	A	,, ..	W. J. Moll ..	Dimboola
457	Brecknock ..	A	Pony ..	R. Hentschel ..	Maindample
517	Brigham Again ..	6	,, ..	J. H. Hindhaugh	Weerite
203	Bright Star ..	A	,, ..	J. J. Simkin ..	Chetwynd
370	Briton's Pride ..	A	,, ..	G. Kenworthy ..	Ballarat
258	Bronte's Pride ..	6	,, ..	J. V. Hosking ..	Towaninnie
518	Bronzewood ..	A	Thoroughbred	Quinlan Bros. ..	Oaklands Junct.

STALLION REGISTER, 1922–23—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
458	Buchlyvie's Choice ..	A	Draught ..	W. J. Westendorf	Winiam
394	Bundoran ..	A	Light ..	A. Graham ..	Bacchus Marsh
185	Bundoora Black Leigh	5	Light ..	Miss B. B. Reid ..	Bundoora
351	Bute Laddie ..	A	Draught ..	Crawford Bros. ..	Tatura
520	Cacique	A	Thoroughbred	J. H. Templer ..	Nhill
253	Calais	A	,,	Geo. Officer ..	Woolsthorpe
371	Caledonia	A	Draught ..	Withers Bros. ..	Bobinawarrah
332	Camperdown, late Friar John	A	Pony ..	Miss N. McKellar	Geelong
107	Canberra	A	Draught ..	C. Bowland ..	Gunbower
20	Cannonite ..	A	Pony ..	Exors. J. C. H. Graves	Mansfield
521	Cape Sky ..	A	Thoroughbred	G. Buckley ..	Wickliffe
506	Captain Threave ..	4	Draught ..	A. S. H. Schroeter	Bute, Sth. Aust.
76	Captain White ..	A	Thoroughbred	R. Gilder, jun. ..	Sale
327	Carmin	A	,,	J. W. P. Prendergast	Benambra
108	Carwelkin ..	A	Light ..	T. Spillane ..	Williamstown
21	Cathedral Chimes ..	A	,, ..	A. B. Carter ..	Guildford
522	Cedric	A	Draught ..	S. L. Moodie ..	Warracknabeal
200	Chal	6	Thoroughbred	T. J. Scott ..	Everton
259	Champion of Kelmscott	6	Draught ..	W. H. Robinson	P. B., Kerang
589	Chief Justice ..	A	Pony ..	O. W. Fisher ..	Morgan's Bridge
77	Cicero	A	Draught ..	R. Lloyd ..	Kyabram
573	Claredon	A	Pony ..	Bennett Bros. ..	Coleraine
123	Clarey	A	,, ..	Jno. Jones ..	Mywee
524	Clarion	A	,, ..	W. H. Thompson	Yalca
11	Claymore	A	,, ..	J. P. Hanrahan ..	Ballan
459	Clem	A	,, ..	N. Cole ..	Camperdown
352	Clyde Boy ..	A	Draught ..	H. Goldsmith ..	Corack
526	,, Laddie ..	A	,, ..	J. Alexander ..	Caniambo
527	Cock Robin ..	A	,, ..	W. Studman ..	Lucknow
528	,, ,, ..	A	,, ..	A. D. Redenbach	Tambo Upper
353	Coliban	A	,, ..	Wm. Todd ..	Taradale
260	Colonel Dale ..	A	,, ..	T. F. Major ..	McMillans
395	,, Garfield ..	A	,, ..	C. Howard ..	Elliminyt
78	Come More ..	A	Pony ..	C. H. West ..	Buchan
444	Commodore Nut ..	A	,, ..	Manifold and Co.	Camperdown
161	Commonwealth ..	A	Light ..	S. Mathieson ..	St. Helen's Plains
591	Congress	A	Pony ..	J. Reid ..	Warrion
529	Contractor ..	A	Light ..	J. T. Ovens ..	Cooma
531	Coronation Day ..	A	Pony ..	H. W. Atkinson ..	Gritjurk
592	Cosmopolitan II. ..	A	Light ..	Wade Bros. ..	Glen Alvie
79	Craigieburn Premier	6	Draught ..	P. Rentsch ..	Croxton E.
593	Creeper	6	Pony ..	F. A. Brown ..	Rosedale
594	Crest of the Wave ..	A	Thoroughbred	F. Hender ..	Franklinford
204	Crown Jewel ..	A	Draught ..	Kuhne Bros. ..	Rainbow
460	Crown Steel ..	A	Thoroughbred	J. Sharp ..	Minyip
595	Culloden	A	Light ..	A. Millard ..	Yaapeet
372	Cyndett II. ..	A	Pony ..	G. J. Marshall ..	Burnley
247	Dalcampbell Clove ..	5	Light ..	C. E. Baker ..	Brunswick W
22	Dalmeny	A.	Draught ..	A. J. Ritchie ..	Arawata
109	Dalmore	A	,, ..	H. Woods ..	Bangerang
205	Dalyston (late Panic)	A	Light ..	J. Kortright ..	Lara
124	Dan Again ..	A	Draught ..	C. I. Dunster ..	Willaura

STALLION REGISTER, 1922–23—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
596	Dan Bells	A	Light ..	H. G. Gregerson	Benalla
328	Dandy	A	Pony ..	P. Purves ..	Rosebud
80	,, Dick ..	A	,, ..	L. Bennett ..	Nullawil
373	,, Duke ..	A	,, ..	Kong Meng Bros.	Longwood
206	,, Junior ..	A	,, ..	R. Withers ..	Bobinawarrah
355	,, Lad ..	A	.. ..	Stuckey Bros. ..	Flynn's Creek
207	,, ,, ..	A	,, ..	A. C. Head ..	Mansfield
532	Dandy's Pride ..	A	,, ..	P. V. Frauenfelder	Wodonga
461	Dandy Style ..	6	,, ..	S. R. Lobb ..	Nagambie
139	Danedite	A	Draught ..	P. Gardiner ..	Carlisle River
110	Darling's Comet ..	6	,, ..	Brock Bros. ..	Moe
24	Deck Top ..	6	Light ..	Mackin Bros. ..	Korong Vale
210	Decorator ..	A	Pony ..	F. E. Jennings ..	Inglewood
239	Delavan	A	Light ..	M. E. McMurtrie	Albert Park
261	Demo Dick ..	A	Light ..	A. E. Nuske ..	Kewell
262	Demolition ..	A	Thoroughbred	A. R. Link ..	Kaniva
519	Detonator ..	A	Pony ..	Quinlan Bros. ..	Oaklands Junct.
254	Dibdale	A	Thoroughbred	Geo. Officer ..	Woolsthorpe
462	Dick Alto	A	Light ..	W. J. Banner ..	Irymple
597	Digger	A	,, ..	R. Dunbar ..	Harston
329	Digit Alto ..	A	,, ..	E. D. Cuthbert ..	Camperdown
504	Dillon Bell ..	A	,, ..	S. J. Lewis ..	Baringhup
81	Direct Argot ..	4	,, ..	R. Matchett ..	Bendigo
501	,, Harry ..	A	,, ..	J. Rousch ..	Cohuna
263	Director	A	,, ..	H. T. Lummis ..	Murphy's Creek
105	Directway.. ..	A	,, ..	R. Matchett ..	Bendigo
238	Don Abbey ..	A	,, ..	M. E. McMurtrie	Albert Park
396	Donald	A	,, ..	Rosetta Bonney	Woomelang
25	,, ...	A	Pony ..	G. H. Whitehead	Minhamite
533	Druce	A	Light ..	Joe Holt ..	Wycheproof
397	Drum Laddie ..	A	Draught ..	A. E. Barker ..	Kyabram
26	Drummond King ..	A	,, ..	H. and G. Holland	Piavella
498	Drysdale	A	,, ..	W. Crozier ..	South Morang
598	Duddon	A	Thoroughbred	E. W. Dixon ..	Cowes, Philip Is.
356	Dundonald's Chief ..	A	Draught ..	H. Doherty ..	St. James
297	Dunsby's Pride ..	A	,, ..	J. R. Baldwin ..	Gre Gre Village
163	Earlmont	A	Light ..	A. J. Snow ..	Stanhope
264	Echelon	A	,, ..	H. T. Nicholas ..	Thornton Lower
82	Electioneer ..	A	,, ..	G. J. Shaw ..	Yarram
534	Emulator's Pride ..	A	,, ..	W. McArthur ..	Noorat
36	Ercildoon Dick ..	A	Pony ..	D. Gardner ..	Milawa
113	Expectation ..	A	Light ..	W. P. Lawlor ..	Coldstream
400	Fairhaven	A	Draught ..	P. Smith ..	Mingay
164	Fashion Direct ..	A	Light ..	R. W. Zirkler ..	Kerang
599	Fashion's Model ..	A	Draught ..	A. B. Hamilton ..	Fish Creek
401	Fast Time.. ..	A	Pony ..	J. Nevett ..	Toolamba
165	Fatty Arbuckle ..	6	Draught ..	Jas. Mills ..	Bangerang N.
211	Federal Prince ..	A	,, ..	Geo. Luckie ..	Springhurst
213	Federation ..	A	Pony ..	A. Wilson ..	Cororooke
214	Fidelio	A	Thoroughbred	T. H. Smith ..	Lalbert
5	Finnimore.. ..	5	,,	Jas. Brown ..	Natimuk
586	First Voyage ..	A	Light ..	Busstt Glasheen ..	Huntly
83	Fitzallan	A	Draught ..	S. V. Vaughan ..	Nyam
402	Flash Donald ..	A	Light ..	John Morris ..	Curyo
535	Flash Jack ..	A	Draught ..	P. McIntyre ..	South Cannum
450	Flowerdale ..	A	,, ..	H. Ledger ..	Pinnaroo, S.A.
374	Foreigner	A	Pony ..	C. Ferrari ..	Devondale

STALLION REGISTER, 1922-23—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
331	Fred	A	Draught ..	A. Dunning ..	Numurkah
536	Freedom	A	Light ..	E. W. Roscoe ..	Goorambat
298	,, ...	A	,, ..	J. Montgomery ..	Milawa
147	Free Scot	A	,, ..	T. Robertson ..	Macarthur
89	Futurist	A	Pony ..	E. Allan ..	Ondit
375	Gallant Lad ..	A	Draught ..	C. T. Weir ..	Yaapeet
148	Garfield Junior ..	A	Pony ..	T. Robertson ..	Macarthur
27	General Harvey ..	A	Draught ..	Koschitzke Bros.	Bangerang
463	,, Keith ..	A	,, ..	C. S. Walker ..	Swan Hill
403	,, McDonald	A	,, ..	W. Pacholli ..	Mysia
404	,, Scott ..	A	,, ..	A. Strawhorn ..	Edgecombe
106	Gentleman Jack ..	A	Light ..	R. Matchett ..	Bendigo
35	Glengarry	A	Pony ..	A. R. Dalton ..	St. Kilda
9	Glenlea	A	Draught ..	A. F. Smith ..	Nypo
405	Glenmarkie ..	A	,, ..	W. Lunn, jun. ..	Romsey
333	Glenmore	A	Light ..	J. F. Prankerd ..	Gillingall
406	Glenscott	6	Draught ..	P. McNeil ..	Kyneton
334	Glyn Trustful ..	A	Pony ..	Roth Bros. ..	Ensay
28	Gold Coin	A	Draught ..	A. E. Cummings	Berrimal
215	Golddust	A	Light ..	W. E. Maybery ..	Nurcoung
537	Golden King ..	A	,, ..	H. Neary ..	Bowman's Forest East
571	Goldenwood ..	A	,, ..	J. T. Ovens ..	Cooma
512	Goldie	A	,, ..	W. J. Minns ..	Melton South
29	Gossoon Bells ..	A	,, ..	Wm. Leach ..	Rheola
538	Grand March ..	A	Draught ..	W. M. Hughes ..	Inglewood
585	,, Voyage ..	A	Light ..	Busst and Glasheen	Huntly
265	Grattan Junior ..	A	,, ..	W. J. Parish ..	Horsham
587	Gratton's Voyage ..	A	,, ..	Busstt and Glasheen	Huntly
30	Grey Marvin ..	A	,, ..	J. S. W. Uren ..	Krowera
299	Guy Tod	A	,, ..	W. Williams ..	St. Arnaud
114	Gypsy Hero ..	A	Draught ..	O'Neill and Son ..	Nathalia
31	Hafren Sensation ..	A	Pony ..	Miss B. B. Reid ..	Bundoora
115	Halcyon	A	,, ..	Mrs. J. M. Macellan	Windsor
464	Hamboltonian Direct	A	Light ..	R. S. Wright ..	Yarrabert
32	Hames	A	,, ..	Thos. Dean ..	Cann River
320	Handyman ..	A	Thoroughbred	H. F. Clarke ..	Miepoll
33	Happy Jack ..	A	Pony ..	J. B. Atchison ..	Southern Cross
84	,, Vein ..	A	Thoroughbred	Fitzpatrick Bros.	Boort
85	Harmattan ..	A	,,	C. Tobin ..	Eskdale
216	Harry Almont ..	A	Light ..	S. Pemberton ..	Wedderburn
157	,, Alto ..	A	,, ..	A. G. Hunter ..	Elmore
158	,, Rose ..	A	,, ..	A. G. Hunter ..	Elmore
399	Hayston	A	Thoroughbred	A. E. Barker ..	Kyabram
4	Hazel's Elect ..	3	Light ..	F. E. Watts ..	Sandringham
335	Heather King ..	A	Pony ..	M. W. Dwyer ..	Merino
116	Hermes of Shetland Heights	A	,, ..	Mrs. J. M. Macellan	Windsor
34	Hero II.	A	,, ..	Greaves Bros. ..	Yannathan
217	Hiawatha of N.Z. ..	A	Draught ..	Waldron Bros. ..	Chinkapook
218	High Degree ..	A	,, ..	Schroeder Bros. ..	Murrayville
166	High Honor ..	A	,, ..	C. H. Feldtmann	Major Plains
465	Highland Boy ..	A	,, ..	S. E. Moss ..	Quambatook
357	,, Cleve ..	A	Light ..	M. L. V. Greatz ..	Irymple

STALLION REGISTER, 1922-23—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
167	High Tide ..	6	Draught ..	J. McEncroe ..	Perth, W.A.
336	,, Fancy ..	A	,, ..	G. Hildebrand ..	Leitchville
266	Hillhead Knight ..	A	,, ..	R. E. Krause ..	Boolite
408	Honest Wilks ..	A	Light ..	H. D. Adams ..	Kotupna
407	Hoprig	A	Thoroughbred	R. F. Carmody ..	Everton
125	Hotspur	A	Pony ..	Z. L. Small ..	French Island
8	Hullabaloo ..	A	Light ..	H. Brooks ..	Waitchie
409	Imperial Crown ..	A	,, ..	T. G. Maher ..	Purnim
267	Invincible ..	A	Draught ..	J. F. Ryan ..	Bearii P.O.
219	Ipidi	A	Thoroughbred	J. O'Keefe ..	Shepparton
136	Ironsides	5	,,	A. Crozier ..	Brighton
337	Jack	A	Pony ..	P. Lawrie ..	Rushworth
168	Jack Annandale ..	A	Light ..	A. O. Foster ..	Maffra
466	,, Smith ..	6	Draught ..	S. Maddern, jun.	Leongatha
539	James Osterley ..	A	Light ..	A. Huddleston ..	South Geelong
540	J.N.S.	A	,, ..	Wilson Bros. ..	Swan Hill
541	Jock	A	Draught ..	G. T. Wolstenholm	Milawa
502	John Marvin ..	4	Light ..	John Rousch ..	Cohuna
189	Jolly Maltster ..	A	Thoroughbred	Defence Dept. ..	Melbourne
542	Kelm Pride ..	A	Draught ..	C. Lippiatt ..	Scotsburn
543	Kelm's Best ..	A	,, ..	J. Bright ..	Mirboo
467	Kilburnie	A	,, ..	A. E. Whitfield ..	Marong
350	King Albert ..	A	,, ..	G. Francis ..	Horsham
376	,, Almont ..	A	Pony ..	John Clarke ..	Mortlake
220	,, Ballance ..	A	Draught ..	F. H. Kennett ..	Kaniva
544	,, Bee	A	Pony ..	W. T. McAlpine ..	Hopetoun
86	,, Clyde ..	A	Draught ..	E. D. Scown ..	Terang
221	,, Duncan ..	A	,, ..	P. Leydon ..	Cooma
410	,, Jimmy II. ..	A	Pony ..	R. H. Larcombe	Mt. Moriac
38	,, of the Kings ..	A	Draught ..	T. Christie ..	Woodend
414	,, of the Roses II.	6	,, ..	M. McGillivray ..	Bald Rock
415	,, of the Shepherds	A	,, ..	E. R. Campbell ..	Nypo
411	,, Osterley ..	A	Light ..	J. M. Fahey ..	Gnotuk
377	,, Osterley A ..	A	,, ..	G. Anderson ..	Newtown, Glng.
545	,, Owyhee ..	A	,, ..	W. Barkmeyer ..	Koondrook
546	,, Wilks ..	A	,, ..	J. Bright ..	Mirboo
39	King's Treasure ..	A	Thoroughbred	G. Ritchie ..	Delatite
268	Kinloch	A	Draught ..	W. Hicks ..	Miram
468	Kitchener	A	,, ..	Dookie Agricultural College	Dookie
300	Knight Royal ..	A	,, ..	J. D. Moran ..	Carron
446	Kola Mauritius ..	A	Light ..	J. Sullivan and Sons	North Melbourne
338	Laddie O'Groat ..	6	Draught ..	L. J. King ..	Quambatook
358	Laird Again ..	A	,, ..	P. Davey ..	Miner's Rest
301	,, of Selkirk ..	A	,, ..	Wm. Troy ..	Myall
505	Lancashire Lad ..	5	,, ..	W. Robertson ..	Armstrong
140½	Larrakin	A	Light ..	H. Sutherland ..	Chinkapook
469	Latest Style ..	A	,, ..	T. Buckley ..	Romsey
547	Lee Creek Squire ..	A	Draught ..	A. K. Lange ..	Armytage
40	Leevialand ..	A	Light ..	A. Bickley ..	Trafalgar
269	Lena's Abbey ..	A	,, ..	W. C. Greaves ..	Monomeith
323	Le Rosier	A	,, ..	E. Parish ..	Horsham
270	Light O'Frisco ..	A	,, ..	J. H. Lucas ..	Macarthur
41	Linkwood	A	Draught ..	W. J. Jenkin ..	Willaura
42	Lion Prince	A	,, ..	J. F. Hurley ..	Bobinawarrah
416	Little Bill ..	A	Light ..	A. T. Corner ..	Fosterville

Stallion Register, 1922–23—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
87	Little Billy ..	A	Pony ..	C. Pratt ..	Watchupga
470	,, Comet ..	6	,, ..	T. McNally ..	Seymour
271	,, Jim ..	A	,, ..	W. J. Watson ..	Laver's Hill
169	,, Jim ..	A	,, ..	D. Scott ..	Maldon
222	,, Lonsdale ..	A	,, ..	J. Neeson ..	Chetwnyd
170	,, Welshman ..	A	,, ..	J. Moschetti ..	Bealiba
471	,, Wonder ..	A	,, ..	G. C. Roughead ..	Ruby
272	Loch Albyn ..	A	Draught ..	M. O'Keefe ..	Pine Lodge R.S.
141	Lord Aldie ..	6	,, ..	S. E. Mackieson ..	Buchan
274	,, Armadale ..	A	,, ..	H. Thomson ..	Newlyn
472	,, Bindi ..	A	,, ..	R. T. Yapp ..	Bindi
339	,, Bingen ..	A	Light ..	E. J. Janetzki ..	Jeparit
340	,, Chancellor ..	A	Draught ..	W. Flack ..	Leonard's Hill
43	,, Dundee ..	A	,, ..	C. Lippiatt ..	Scotsburn
151	,, Dalmuir ..	6	,, ..	E. W. Harders ..	Dimboola
341	,, Everest ..	A	,, ..	G. R. Ladson ..	Mincha West
473	,, Jellicoe ..	6	,, ..	McMahon Bros. ..	Walpeup
126	,, Lynden ..	A	,, ..	Jas. Vickers ..	Colbinabbin W.
302	,, Northcote ..	A	,, ..	Wm. Hicks ..	Miram
412	,, Percival ..	A	,, ..	J. M. Fahey ..	Gnotuk
44	,, Pilatus ..	A	Thoroughbred	D. W. Major ..	Goroke
474	,, Plunton ..	A	Draught ..	M. J. and J. J. Runceman	Mallan, N.S.W.
88	,, Ronald ..	A	,, ..	E. Allan ..	Ondit
90	,, Wallace ..	6	,, ..	Jas. Farrell ..	Briagolong
127	,, Welkin ..	6	Thoroughbred	W. and H. Carmichael	Swan Hill
548	Lorryman ..	A	Draught ..	C. Baldry ..	Cosgrove
417	Lost Time ..	A	Thoroughbred	A. Martin ..	Maffra
171	Loudoun Squire ..	6	Light ..	J. Dunlop ..	Birregurra
172	Loueen ..	6	,, ..	W. G. Anderson ..	Craigieburn
45	Loyalist ..	A	Draught ..	O. Gray ..	Wedderburn
91	Lucky Jim ..	A	,, ..	W. H. Morris ..	Woolsthorpe
475	Lue Ribbons ..	A	Light ..	L. Williams ..	Ross Creek
68	Lymm Truffle 2nd ..	5	Draught ..	J. Stokes ..	Melbourne
173	Lyndale	A	,, ..	H. Conn ..	Barrakee
275	Magician	A	,, ..	T. Adkins ..	Korumburra
476	Mainstitch ..	A	Thoroughbred	F. C. Mackay ..	Violet Town
359	Major Dale ..	A	Draught ..	J. Forster ..	Boort
277	,, Lawrence ..	A	,, ..	M. Parnell ..	Katamatite
437	,, Ribbonwood ..	5	Light ..	F. W. Grabsch ..	Horsham
549	,, Style ..	A	Draught ..	R. Boldt ..	Silvan
174	,, Thornley ..	6	,, ..	T. Torpey ..	Turriff
223	Malacca	A	Light ..	Beattie Bros. ..	Tangamah
550	Maltdale	6	,, ..	H. Williamson ..	Whorouly
360	Maltese Cross ..	A	,, ..	T. J. Witherow ..	S. Wangaratta
342	Mambrino Wilkes ..	A	,, ..	J. Brown ..	Horsham
128	Maori Chief ..	A	,, ..	John Caldow ..	Winchelsea
391	,, Jack ..	A	Draught ..	A. Potter ..	Naroghid
94	Marcus	A	Light ..	W. E. J. Craig ..	Melbourne
343	Marmaduke ..	A	Pony ..	A. J. Gillies ..	Noorat
418	Masher Boy ..	A	,, ..	T. Mellington, jun.	Rainbow
224	Master Dix ..	A	Thoroughbred	P. T. Larsen ..	Eskdale
477	,, Valve ..	A	Pony ..	A. Lang ..	Castlemaine
111	,, Wattee ..	A	Draught ..	Brock Bros. ..	Moe
93	McGregor's Fancy ..	A	,, ..	R. J. Wilson ..	Krowera
378	Medbourne Prince ..	A	,, ..	F. Shaw ..	St. Arnaud

STALLION REGISTER, 1922-23—*continued.*

Cert No.	Name	Age.	Class.	Owner.	Address.
		Yrs.			
225	Melrose Bounty ..	A	Light ..	Melrose Dairy Coy. Pty. Ltd.	Malvern
478	Menkawrah ..	A	Thoroughbred	J. L. Vallence ..	Cohuna
551	Message	A	Light ..	A. J. Tack ..	Kongwak
479	Merzug	6	,, ..	H. Doherty ..	Hill End
149	Miniature 3rd ..	A	Pony ..	T. Robertson ..	Macarthur
226	Moira Lad ..	A	Draught ..	C. R. Cunnington	Bamawm East
92	Monty	A	Pony ..	W. H. Morris ..	Woolsthorpe
379	Moolap	A	Light ..	T. Mitchell ..	Durham Lead
324	Morocco Lad ..	A	Draught ..	Mrs. E. Parish ..	Horsham
46	Moving Picture ..	A	Thoroughbred	Exors. T. C. Maidment	Moyston
47	,, ,, ..	A	Light ..	W. Fisher ..	Yaapeet
312	Mystery	A	,, ..	C. E. Fewster ..	N. Brighton
503	Napoleon	A	Draught ..	S. J. Lewis ..	Baringhup
480	Never Forget ..	A	Pony ..	F. Ballard ..	Picola
48	Newton Banks ..	A	Draught ..	O. Shaw ..	Wooriwyrite
49	,, Mains ..	A	,, ..	J. A. G. Wilson ..	Kenilworth
175	Newton's Best ..	A	,, ..	C. A. Graham ..	Rupanyup
303	Nimrod	A	Pony ..	G. Small, jun. ..	Birchip
481	Norval Junior ..	A	Light ..	J. English ..	Bulart
344	Oaklands Pride ..	A	Draught ..	C. F. Dolan ..	Ouyen
176	October	A	Light ..	N. F. Johnson ..	Nalinga
482	Onward O ..	A	Draught ..	E. Coward ..	Congupna Rd.
177	Operation	A	Light ..	T. Ley, jun. ..	Tallangatta
552	Orcwar	A	,, ..	T. J. Pratt ..	Colac
278	Orion	A	Thoroughbred	W. D. Cross ..	Tangambalanga
483	Patchwork ..	A	Light ..	H. Milte ..	Lascelles
142	Patrician	A	Draught ..	W. Gibbons ..	Galah
361	Patrick's Pride ..	A	,, ..	E. L. Edwards ..	Bacchus Marsh
419	Patriot	A	,, ..	A. G. Mibus ..	Croxton E.
50	Patriotic	A	,, ..	H. L. Ferry ..	Buangor
227	Pearlyn	A	Light ..	F. W. Bowden ..	Won Wron
420	Perfection ..	A	,, ..	E. A. Baker ..	Gilleston
228	Peterhof	A	Thoroughbred	W. T. Rowe ..	Wallinduc
257	Piper	A	Pony ..	Jas. Ford ..	Wickliffe
241	Pleasant Voyage ..	5	Light ..	W. Maloney ..	Mooroopna
152	Politician	A	,, ..	W. J. Wood ..	Moyhu
155	Premier Again ..	5	Draught ..	D. C. Greig ..	Melbourne
582	,, Jack ..	A	,, ..	J. W. Smith ..	Elmore
279	,, Massey ..	A	,, ..	Thos. Haw ..	Mitiamo
229	,, Montgomery of Willowbank	A	,, ..	E. Doherty ..	Congupna
484	,, Thomas ..	A	,, ..	C. A. Lindorff ..	Wood Wood
51	Pride of Clutha ..	A	,, ..	J. H. Cornfoot ..	Glenvale
530	,, Lochiel ..	A	,, ..	J. T. Ovens ..	Cooma
553	,, the South ..	A	,, ..	Mrs. S. E. Kent ..	P.B., Sheep Hills
112	Prince Aldie ..	A	,, ..	Brock Bros. ..	Moe
52	,, Alexander ..	A	,, ..	Trask Bros. ..	Warncoort
485	,, Bally ..	A	Pony ..	H. C. Bird ..	Yarram
95	,, Bells ..	A	Light ..	R. Youren ..	Natte Yallock
421	,, Charming ..	A	,, ..	Williams Bros. ..	Thornton
316	,, Derby ..	5	,, ..	Vines and Hardy	Hawthorn
186	,, Hafrod ..	4	Pony ..	Miss B. B. Reid ..	Bundoora
53	,, Harold ..	A	Light ..	C. E. Darley ..	Hopetoun

STALLION REGISTER, 1922-23—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
380	Prince Lyall ..	6	Pony ..	G. L. Buchanan ..	Horsham
368	,, Maurice ..	A	Light ..	W. McNaughton ..	Walpeup
230	,, of Nullan ..	A	Draught ..	R. V. Quick ..	Brim
153	,, Rhymney ..	6	Pony ..	E. Kennedy ..	Bass
129	,, William ..	A	Draught ..	W. R. Berger ..	Devenish
422	Quatta's Belmont ..	6	,, ..	M. Lindsay ..	Baranduda
445	Radium	6	Light ..	Manifold and Co.	Camperdown
96	Reality Rex ..	A	Pony ..	John Archibald ..	Sale
118	Red King	A	Light ..	W. Holland, sen.	Benambra
447	Referee	A	Draught ..	P. Lock ..	Warrnambool
97	Relight	A	Light ..	D. Cameron ..	Newham
345	R. H. Y. Harold ..	6	Pony ..	V. Ladlow ..	Dooen North
231	Ribbon Bells ..	A	Light ..	Beattie Bros. ..	Tungamah
381	Rimfire	A	Pony ..	Lucas Bros. ..	Carlisle River
178	Robin Hood III. ..	A	,, ..	Noyes and Griffiths	Drouin
292	Rocket	A	,, ..	A. W. Thomson ..	Hamilton
212	Roseberry ..	6	Light ..	E. McKoy ..	Wodonga
570	Royal Albert ..	A	Draught ..	R. J. Evans ..	Bushfield
250	,, Belmont ..	A	,, ..	Goss Bros. ..	Donnybrook
98	,, Ben ..	A	,, ..	J. M. Hamilton ..	Inverleigh
54	,, Blend ..	A	,, ..	T. Long ..	Nhill
6	,, Chief ..	3	,, ..	W. G. Burns ..	Goroke
280	,, Churchill ..	A	,, ..	A. Kennedy ..	Tatura
554	,, Crown ..	A	,, ..	J. A. Goodwin ..	Wunghnu
346	,, Dandy ..	A	Pony ..	D. Fletcher ..	Gannawarra
145	,, Duke ..	6	Draught ..	Exors. C. W. Dennert	Hamilton
555	,, Escort ..	A	,, ..	Hooper Bros. ..	Devenish
330	,, Fashion ..	A	,, ..	Ed. Cuthbert ..	Camperdown
55	,, Garvin ..	A	,, ..	G. F. Brown ..	Winchelsea
362	,, Hero ..	A	,, ..	G. Giddings ..	Sea Lake
423	,, Mac ..	6	Light ..	Charity Bros. ..	Serpentine
138	,, Malt ..	5	Thoroughbred	R. H. Ward ..	Sandringham
354	,, Mint ..	A	Light ..	L. A. Harper ..	Rutherglen
130	,, Prince ..	A	Draught ..	C. E. Umbers ..	Sea Lake
305	,, Robin ..	A	,, ..	J. Boyle ..	Boort
121	,, Robin ..	A	,, ..	A. Pyers ..	Charlton
201	,, Saxon ..	A	,, ..	C. E. Barrie ..	Melton
398	,, Scott ..	A	,, ..	D. Golding ..	Cocamba
424	,, Shepherd ..	A	,, ..	Jas. McBean ..	Miga Lake
425	,, Standard ..	A	,, ..	K. Cameron ..	Warracknabeal
525	,, Treasure ..	A	,, ..	W. H. Thompson	Yalca
179	,, Willie ..	A	,, ..	K. Cameron ..	Warracknabeal
99	Safe Voyage ..	6	Light ..	V. Meyers ..	Lockwood
56	Sahara	6	Pony ..	E. A. Mahar ..	Kerang
426	Santrel	A	Light ..	R. W. Storey ..	Murchison E.
131	Saturn	A	Pony ..	A. J. Plum ..	Docker's Plain
190	Scotch Thistle ..	4	Draught ..	J. R. Stokes ..	Melbourne
37	Scotland's Peer ..	A	,, ..	D. Gardner ..	Milawa
451	Scottish Lad ..	A	,, ..	D. L. Bodey ..	Jung
306	Sea King	A	,, ..	A. McCready ..	Colac
583	Seldom	A	Light ..	R. N. Keating ..	Antwerp
281	Selkirk	A	Draught ..	T. T. Mulder ..	Murroon
245	Senator	6	,, ..	J. R. Stokes ..	Abbotsford
556	Shandon Bells ..	A	Light ..	A. Missen ..	Truganina
240	,, ,, ..	A	,, ..	T. Long ..	Nhill
325	Shepherd Plaid ..	A	Draught ..	Mrs. E. Parish ..	Horsham

STALLION REGISTER, 1922–23—*continued.*

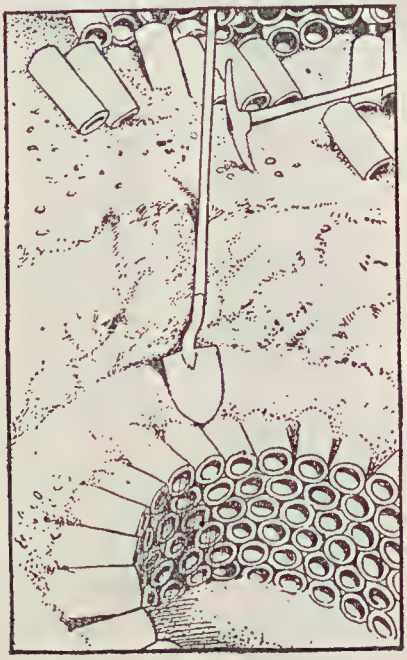
Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
57	Shepherd Boy ..	6	Draught ..	I. Kelly ..	Korong Vale
557	Shilinga	6	Light ..	D. McLennan ..	Derrinallum
558	Silver Bells ..	A	,, ..	T. Coonerty ..	Yarragon
137	,, King ..	6	,, ..	E. D. Scown ..	Terang
58	Silverlight.. ..	A	Pony ..	R. J. Jarvis ..	Cudgewa
119	Silverton	A	,, ..	J. Rogers ..	Allansford
59	Sir Clyde	6	Draught ..	S. J. Taylor ..	Lake Boga
10	,, Fabric	5	,, ..	Allitt Bros. ..	Diapur
486	,, Goulding ..	A	Pony ..	S. T. Rash ..	Ballarat
559	,, Hector.. ..	A	Draught ..	F. Wallbridge ..	Somerton
347	,, Onward ..	A	,, ..	W. Guymer ..	Katamatite
427	,, Regulus ..	A	,, ..	J. B. Howe ..	Bridgewater
560	,, Roderick ..	A	,, ..	W. Burn ..	Trentham
191	,, Rupert ..	3	,, ..	J. J. Power ..	Rochester
428	,, Wilfred ..	A	,, ..	A. J. Mackay ..	Coonooer Bridge
590	,, William Wallace	A	,, ..	O. W. Fisher ..	Morgan's Bridge
382	Skobeloff	A	Thoroughbred	A. Thomson ..	Lismore
143	Snapshot	6	Light ..	H. Crawford ..	Dunkeld
383	Solomon IV. ..	A	Draught ..	C. H. Perkins ..	Rainbow
187	Some Sensation ..	3	Pony ..	Miss B. B. Reid..	Bundoora
307	,, Style ..	6	Light ..	T. F. Armstrong	Campbell's Creek
132	Southern Star ..	A	Draught ..	L. Curran ..	Cannie
384	Springwood ..	A	Light ..	G. J. Vagg ..	Cobden
100	Squib	A	Pony ..	A. Robertson ..	Koria
133	Stanley May ..	6	Draught ..	G. R. Ladson ..	Mincha West
232	Starlight	A	,, ..	J. Fuller ..	Mitre
561	Starlight	A	Pony ..	J. Giles ..	Bairnsdale
60	Stern Anchor ..	A	Thoroughbred	A. Noble ..	Birregurra
282	Stirling Castle ..	A	Draught ..	V. McHenry ..	Cowes, Ph. Isd.
309	,, Prince ..	A	,, ..	R. A. Cumming ..	Bael Bael
61	St. Mark	A	,, ..	F. Marshman ..	Brim
120	Stockman's Lad ..	A	,, ..	D. C. Gilsenan ..	Bung Bong
310	Straightaway ..	A	Light ..	T. Allen ..	Narrewillock
385	St. Simon	A	Draught ..	G. J. Butler ..	Carisbrook
311	St. Swivan ..	A	Thoroughbred	S. Raine ..	Bendigo
365	Style O	A	Light ..	W. Barry ..	Heathcote
209	Sudbourn's Victory..	6	Draught ..	A. C. Head ..	Mansfield
233	Sunbury	A	Light ..	T. C. Nolan ..	Tarrawingee
134	Sweet Abbey ..	A	,, ..	N. Chamberlain ..	Morwell
562	Taffy	A	Pony ..	H. Jarvis ..	Omeo
101	,, ...	A	,, ..	J. Sargent ..	Yanac
304	Tatahu	6	Light ..	M. Stephenson ..	Fitzroy
234	Tax Payer ..	A	Pony ..	R. Jamieson ..	Darlington
600	The Abbot ..	A	Light ..	A. B. Hamilton ..	Fish Creek
62	,, Factor ..	A	Draught ..	C. Bates ..	Dobie
563	,, General ..	A	,, ..	W. Lincoln ..	Portarlington
63	,, Hague ..	A	Thoroughbred	S. Winter Cooke	Hamilton
244	,, Joker ..	A	Pony ..	A. E. Ellery ..	Redesdale
492	,, Premier ..	A	Draught ..	G. Taylor ..	Leichardt
487	,, Standard ..	A	,, ..	J. Forsyth ..	Murrayville
154	,, Starling ..	A	Light ..	S. Farrell ..	Stratford
283	,, Warrior ..	A	Pony ..	H. Wilson ..	Wodonga
488	Thoughtful ..	A	,, ..	P. McIntosh ..	Ondit
429	Tim Brigham ..	A	,, ..	J. C. Nicoll ..	Euroa
564	Titanic	A	,, ..	J. E. Mark ..	Echuca
293	Toby	A	,, ..	A. W. Thomson ..	Hamilton

STALLION REGISTER, 1922–23—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
565	Togo	A	Draught ..	H. Currie ..	Waterloo
284	Tom Tit	A	Pony ..	R. W. Jukes ..	Maryborough
64	Tony Bells ..	A	Light ..	R. Hannah ..	Lilydale
430	Torfrid	A	Thoroughbred	D. Rogers ..	Boolarra
243	Toy Bells	A	Light ..	W. H. Horn ..	Ararat
489	Trafalgar	A	Thoroughbred	Exors. W. E. Mitchell	Corryong
313	True Steel	A	Pony ..	Letcher Bros. ..	Avon Plains
294	Trump	A	,, ..	A. W. Thomson ..	Hamilton
314	Udale	A	Draught ..	J. Holdsworth ..	Jung Jung
490	Vanquisher ..	A	,, ..	J. Meagher ..	Murrayville
491	Varco	A	Thoroughbred	W. McMeeken ..	Kerang
117	Viking of Methven ..	A	Pony ..	Mrs. Maclellan ..	Windsor
235	Waironga Prince ..	A	Draught ..	G. W. Fielding ..	Watchem
180	Wally	A	,, ..	N. C. Keating ..	Speed
566	Wee Jim	A	Pony ..	J. R. Kettyle ..	Castlemaine
65	Welsh Flyer ..	A	,, ..	F. Irving ..	Tyrell Downs
431	,, ,, ..	A	Light ..	P. J. Reid ..	Milawa
236	,, ,, IV. ..	A	Pony ..	J. Williams ..	Nalinga
432	Westmont	A	Light ..	Wm. Hay ..	Bullock Swamp
181	What Oh	A	Pony ..	R. J. Hill ..	Dandenong
567	What's Wanted ..	A	,, ..	G. T. Brown ..	Officer
285	White Stockings ..	A	Light ..	Munro Bros. ..	Walpeup
433	Wigtonshire ..	A	Draught ..	Burton Bros. ..	Dennison
1	Wigton's Pride ..	3	,, ..	L. J. King ..	Quambatook
286	William of Orange ..	A	Thoroughbred	A. J. Gray ..	Essendon
287	Wiltshire	A	Light ..	C. Wood ..	Minyip
568	Windlesham ..	A	Thoroughbred	W. T. Hillman ..	Bendigo
348	Winsome Chief ..	6	Draught ..	Peterson and Bourchier	Kellalac
289	Winteriga ..	A	Thoroughbred	W. Coe ..	Coleraine
326	Wonga	A	Light ..	Mrs. E. Parish ..	Horsham
144	Woodlands Dandy ..	A	Pony ..	J. H. Kittyea ..	Jung
386	Yarrawaak ..	A	Light ..	F. D. Macdonald	Terang
363	Yeneda	A	Thoroughbred	D. A. Hutchison	Yan Yean
315	Young Badaween ..	A	Pony ..	W. Shaw ..	Wycheproof
493	,, Brigham ..	A	,, ..	J. A. Darlington	Paradise
237	,, ,, ..	A	,, ..	W. J. Craig ..	Cobden
434	,, Clarionet ..	A	Light ..	John Mitchell ..	Piavella
494	,, Clyde ..	A	Draught ..	J. Ludeman ..	Nirranda
276	,, Comet ..	A	Pony ..	T. Adkin ..	Korumburra
495	,, Coronation ..	A	Draught ..	G. Pitt ..	Jeparit
102	,, Cymra Bach	A	Pony ..	S. J. Douglas ..	Stuart Mill
435	,, Dundonald ..	A	Draught ..	R. Coleman ..	Milawa
182	,, General ..	A	Pony ..	W. Maddill ..	Tongala
448	,, Ginger ..	A	,, ..	Manifold and Co.	Camperdown
183	,, Hamilton ..	A	Draught ..	Arnold Bros. ..	Rupanyup N.
150	,, Ki Ki ..	A	Pony ..	T. Robertson ..	Macarthur
387	,, Lyon ..	A	Draught ..	A. W. Brown ..	Speed
497	,, Nailstone ..	A	,, ..	J. J. Nulty ..	Walpeup
66	,, Patrician ..	A	,, ..	F. E. Southwell ..	Linga
569	,, Prince Royal	A	,, ..	W. D. Gibb ..	Moyhu
184	,, Royal Oak ..	A	,, ..	H. Walker ..	Merbein
364	,, Shifter ..	A	Light ..	A. Linke ..	Jeparit
67	,, Timekeeper	A	Draught ..	Stokes and Caffrey	Melbourne
135	,, Yelretso ..	A	Light ..	M. Ford ..	Maryborough

THE DRY WELL FOR DRAINAGE.

When there is a gravel subsoil the dry well has proved a cheap and very efficient means of drainage for the surface water. It is especially appropriate for draining low, wet places in the barn-yard, the pig-yard, and around the watering-trough and farm buildings. The construction is very simple. One digs a hole 4 or 5 feet in diameter down to a few feet into the gravel. The size of the hole should depend largely on the amount of surface water to be removed at any one time. In most cases this hole is filled with large stones or other



coarse material, which allows the water to escape into the gravel, where it is carried away very rapidly. The accompanying illustration shows one of these dry wells walled up with tile. This leaves a much greater gravel surface, and thus enables the water to get away more quickly than where the well is filled up with rocks or other coarse material. When tiles are used, the centre of the well is not filled at all, but the tiles are simply used as a well to keep the gravel from caving in, and to allow the water to escape. The well is covered with 2 x 6 boards, with small cracks left between them so that the water may enter the well. These boards may be sunk into the ground about 6 inches, and covered over with small stones, giving it a much neater appearance, and removing all possibility of stock slipping on the boards.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

Cultivation.

Orchard ploughing should now be finished, and the main work for the next few months will be an endeavour to keep the soil surface loose, friable, and well opened. The consolidation of the surfaces must be avoided, as a hard, compact surface means the loss of much soil moisture, by capillary attraction. So that after rains, heavy dews, the spray pump and other traffic, it will be as well to run the harrows over the surface of the soil, so as to keep the surface well broken and to maintain a good earth mulch. If the harrows are not sufficient to break the clods, a spiked or heavy roller should be drawn over it, and then harrowed. If the weather is at all dry it is advisable to plough only as much as may be harrowed in the same day. By immediately following up the ploughing with harrowing a minimum amount of moisture is lost by capillarity.

Green manure crops should now be ploughed under, and should they be very abundant in growth, a roller should be run over them and ploughed with a coulter attached. Any of these means will serve to get the crop underground, which is a desideratum.

In addition to the retention of soil moisture, cultivation of the orchards will suppress the weeds which rob the trees of food and moisture. The suppression of weeds is an important work in the spring and summer, and they should be rigorously hoed or cultivated out.

Spraying.

Spraying for all pests and diseases is, at this time of the year, an important work in the orchard. Bordeaux or lime sulphur spraying for the black spot of apples and pears, for scab and shothole in peaches and apricots, for the leaf curl of the peach and rust of the plums and peaches, should now be completed.

Where there are indications that previous sprayings have not been thoroughly successful, a weak lime sulphur spray should be given.

Wherever they are present, nicotine sprays should be given to combat the peach aphis, and the pear and cherry slug. For the latter pest, arsenate of lead should not be used if the cherries are within a month of ripening. Arsenate of lead is so tenacious, and thus it is likely to remain on the fruit until it is ripe, when it would be dangerous to the consumer. Thus, while this property of remaining on the fruit for a considerable time is of great value in the Codlin Moth spraying, it is quite of the opposite value when used for the pear and cherry slug. Either tobacco water or hellebore is useful for the eradication of this pest, as these substances do not remain long on the trees, and they are quite as effective as arsenate of lead. Even a dry dusting with lime or with ordinary soil will keep the slugs in check.

Codling moth spraying, too, will be in evidence this month. It is generally assumed that the appearance of the moth is coincident with

the bursting of the flowers. This is not always so—the moths frequently come slightly later than the blooming period. Owing to the rapid expansion of the fruit, it is well to follow the first spraying with a second in a week or ten days' time. Arsenate of lead is still the spray for the Codlin moth, nothing having been found to supersede it.

Arsenate of lead may be mixed with nicotine sprays, or with Bordeaux mixture, without any detriment to either spray, if necessary.

The Vegetable Garden.

A good tilth, and a well-pulverized soil, are the main soil necessities in the vegetable garden this month. Frequent cultivations will keep in the soil moisture, and will obviate the necessity for surface waterings. At the same time, it should be remembered that the vegetable garden requires more water than the flower garden, owing to the quick growth of the plants. Quickly-grown vegetables are more tender and more luscious than slowly-grown ones: thus a good water supply will need to be maintained. Weeds are great moisture-robbers, and they should be kept out of the vegetable garden at this time of the year.

Late plantings of tomatoes may now be carried out; all early-planted plants should be fed, staked, and the laterals pinched back. A little bone-dust or superphosphate may be given, but these are not equal to animal manures, if the latter are available. Chemical manures should only be given in limited quantities, 6 or 7 cwt. per acre would be a heavy dressing, and this works out at nearly 3 ozs. per square yard. Vegetable growers may easily try this for themselves, and it will soon be seen that 3 ozs. scattered over a square yard of surface will appear to be a very light dressing.

French beans, carrot, parsnip, celery, radish, peas, and turnip seeds may now be sown. Seeds of cucumber, melon, and pumpkin family may now be sown in the open ground. All seedlings may be transplanted on favorable days, and it will be well to sprinkle the tops as well as to water the roots.

Asparagus beds may be top-dressed with manure, and kept well weeded. Such weak growths that are not gathered for eating should be cut out of the beds.

The Flower Garden.

Flower gardens are troubled with many pests at this time of the year. Rose aphis is one of the most prevalent; frequent applications of tobacco water will keep this pest in check. The hot winds should not be waited for so as to rid the garden of the pests, because a great deal of damage is done before the hot winds come. They should be sprayed in any case.

Rose mildew will also need combating. This may be done by dusting the bushes with sulphur while they are wet with the morning dew. The ground may also be sprinkled, as the fumes check the fungus.

The latest American remedy is to dust the bushes with one part of dry arsenate of lead to nine parts of sulphur. This is also a remedy for black spot of roses.

Leaf-rolling or leaf-eating insects will need to be sprayed with arsenate of lead or Paris green.

The surface should be kept well hoed so as to conserve the moisture, especially after the frequent waterings that should be given.

Chrysanthemums may be planted in soil that has been dug over two or three times, and each time digging in manure. The soil must not be too rich, but must be well drained.

Bulbs that have lost their foliage may be lifted, but do not cut the foliage, as this means loss of sap and energy.

Asters, zinnias, salvias, balsams, amaranthus, celosias, &c., lobelia, bedding begonia, iresines, alternantheras, &c., may now be planted out for summer and autumn flowers.

REMINDERS FOR NOVEMBER.

LIVE STOCK.

Horses.—Continue to feed stable horses well; add a ration of greenstuff. Rug at night. Continue hay or straw, chaffed or whole, to grass-fed horses. Feed old and badly-conditioned horses liberally. If too fat, mares due to foal should be put on poorer pasture. Turn out workers due for a spell at grass. In view of sand trouble this year horses which have been paddocked all the winter should not be put to work until properly conditioned and any sand accumulation got rid of. A course of three or four bran mashes, after a twelve hours' fast, followed by 1 to 1½ pints of linseed oil, is helpful. Repeat in two or three days, if necessary. Colts to be gelded should be operated on before hot weather sets in.

Cattle.—Except on rare occasions, rugs may now be used on cows at night only. Continue giving hay or straw, if possible, to counteract the effect of green grass. Be prepared for milk fever. Read article in *Year-Book of Agriculture*. 1905, page 314. Give calves a dry shed and a good grass run. Continue giving milk at blood heat to calves. Be careful to keep utensils clean, or diarrhœa will result. Do not give too much milk at a time for the same reason. Feed regularly with regard to quantity and time. Give a cup of limewater in the milk to each calf, also place crushed oats or lucerne hay in a trough so that they can eat at will.

Pigs.—Supply plenty of bedding in well-ventilated styes. Keep styes clean and dry, and feeding troughs clean and wholesome. Sows may now be turned into grass run. Sows suckling young should be well fed to enable them to produce plenty of milk. Give young pigs pollard and skim milk in separate trough as soon as they will take it, and keep them fattening from the start to get them off as early as possible. Give a tablespoonful of bone meal, or half that amount of mineral phosphate per 100 lbs. live weight in food daily. If pigs are lousy dress them with kerosene emulsion or sulphur and lard, rubbing well into crevices of skin, and disinfect styes. Pig breeding and feeding should be very profitable for a long time to come, and it should be safe to launch out now.

Sheep.—Prepare for dipping. Ascertain exact contents of bath before mixing. Powder or paste dips have the most lasting effect, particularly where lice have been bad. Hold sheep in the bath not less than half a minute; if badly infested, longer. Submerge heads twice, but allow them to rise quickly—most deaths after dipping are due to gross carelessness in holding sheep under too long, the dip wash being taken in on to the lungs. Dip rams and full grown sheep first, while bath is full, lambs last. Yard sheep over night. Dip while empty, and avoid fouling the drainer. Commence early in the day, and allow sheep to dry before nightfall. Avoid travelling long distances to and from baths, and

dipping sheep while overheated. Do not roughly throw sheep in. Avoid filthy baths; this increases a dead tip in hot areas, and as a rule are over strength.

It is unsafe, and against instructions, to use powder dips in increased strength. Sheep badly lice-infested should be dipped directly off shears, and again in six weeks' time. Sheep with over a reasonable amount of wool on should be dipped at less strength than given on instructions. Close, fine-wooled sheep particularly so.

When constructing new dips, remember moderate-sized ones are most economical, just as efficient, and can be more easily emptied as they become fouled, and if they are near water can be quickly filled.

BEE-KEEPING.

In most districts, October is the principal swarming month; in late localities, particularly at the higher elevations, most of the swarming takes place in November. Where a honey flow is expected from Redgum during December and January, it is not wise to make a further increase in the number of colonies by allowing after-swarms to come off and hiving separately, as the parent stock would be too much depleted of bees, and there would not be sufficient time for it to recover, or for the swarms to build up, before the honey flow is on, and much of it would therefore be lost.

After-swarms can best be prevented by hiving the first or prime swarm on the old stand and moving the colony from which it came to a new stand, at the same time destroying all the queen cells in it except one—the most perfect and forward one.

If no increase at all is desired, the parent colony may be left alongside the old stand on which the swarm was hived, but with the entrance facing in a different direction. When the young queen in the swarmed stock is laying, which will be in about three weeks, the hive may be gradually turned round till it faces the same way as the swarm, and, after removing the old queen from the swarm, the two stocks may be re-united, thus making a very strong colony with a young laying queen, in the best condition for storing honey and very unlikely to swarm again the same season.

As in most localities the colonies have come through the Winter very strong, there is likely to be much swarming wherever Cape Weed or some other pollen-yielding plant is plentiful, the duration of blooming depending, of course, upon the weather.

When several days of bad weather follow the hiving of swarms, it may be advisable to feed sugar syrup (one part sugar to one part water) to keep up comb-building and brood-rearing, so as to have the greatest number possible of field bees in the hive during the honey flow later on. Honey should never be used for feeding bees, unless it comes from an apiary which has been absolutely free from disease for at least two years.

CULTIVATION.

FARM.—Plant main crop of potatoes. Cut hay and silage. Weed early potatoes. Sow maize and millets. Weed tobacco beds, and water, if dry.

VINEYARD.—Field grafts require careful attention in the way of removal of suckers and scion roots. (See Bulletin on "Spring Grafting," No. 38, page 29.) Keep a sharp look out for Downy Mildew; whether the disease is seen or not, finish spraying by 20th October. A preliminary spray when the bunches are most visible is strongly recommended. In irrigated vineyards make it a rule to *spray immediately before watering.* Information on "Mildew and its Treatment," will be posted on application. Cultural work, such as scarifying and hoeing, should be actively pushed forward, so as to provide as good a "mulch" as possible during summer. Proceed with tying up, stopping and topping. Avoid excessive topping, summer pruning being usually more injurious than useful in warm, dry climates. Cincture Zante currant vines after flower caps have fallen. Apply second sulphuring just before blossoming, wherever Oidium was prevalent last year.

Cellar.—Taste all young wines; beware of dangerous symptoms in unfortified fruity wines, which may need treatment. Fill up regularly all unfortified wines.

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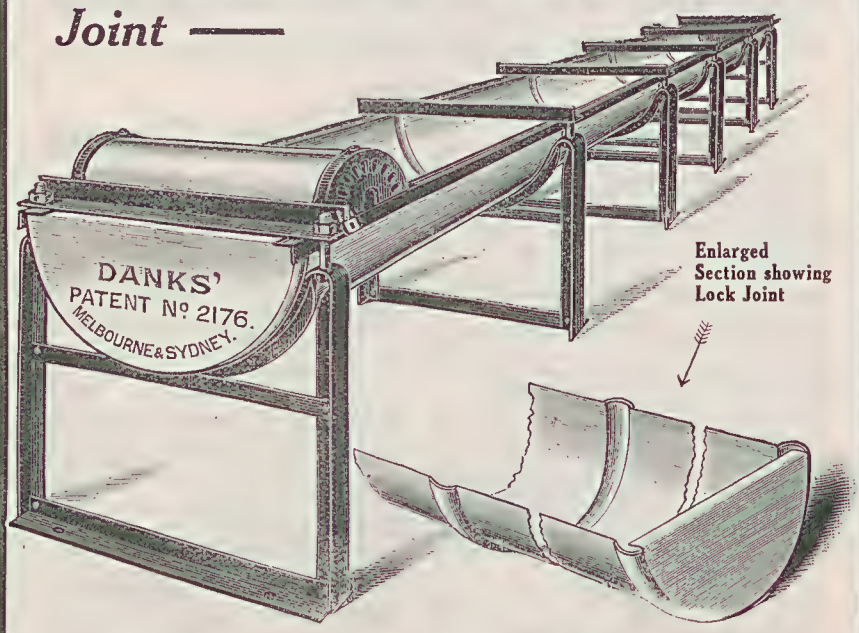

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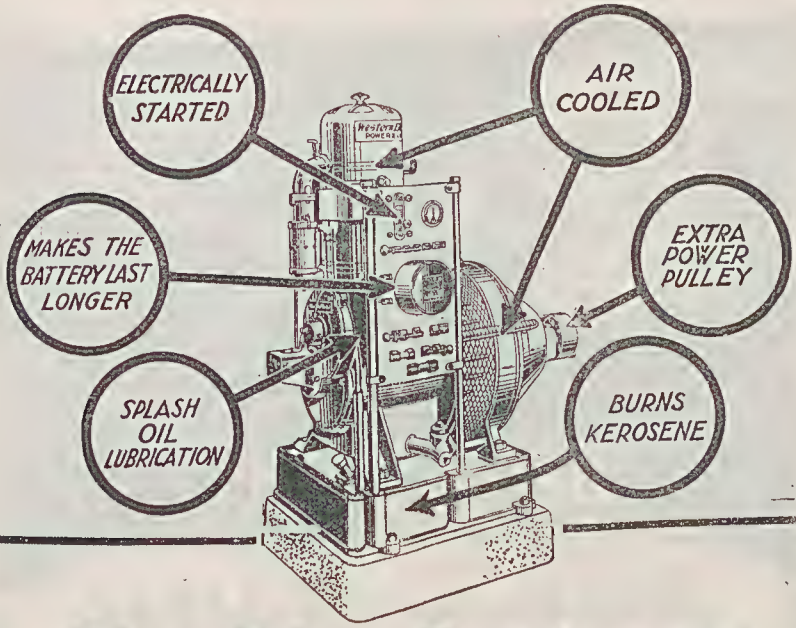

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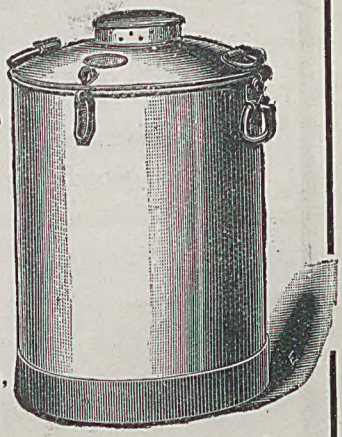

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Sire's D. Dam's	,, 9510 ,,	...	12 ,, ,,	8033 ,,
G. Sire's D. Dam's	,, 10215 ,,	...	7 ,, ,,	9386 ,,
G.G. Sire's D. Dam's	,, 12565 ,,	...	10 ,, ,,	8853 ,,
G.G.G. Sire's D. Dam's	,, 10088 ,,	...	2 ,, ,,	9754 ,,

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PICTURESQUE VICTORIA

SUMMER EXCURSIONS

The Victorian Railways issue **Tourist Tickets** to the **Seaside, Mountains, Rivers, Lakes, and Caves, from 15th October till 30th April**

MOUNT BUFFALO

Excursion Fares all the year round

First-Class Combination Week Tickets

covering Transport and Accommodation, at "The Government Chalet," are issued on Mondays by the 6.30 a.m. train, and on Fridays by the 4 p.m. Express train, at **£8 16/-**

Excursionists wishing to travel by motor from Bright or Porepunkah (as the case may be) may do so, weather and circumstances permitting, on payment to the Coach Coy. of 12/6 extra.

Special Week Tour Tickets

all including Accommodation, Transport, Outings, &c.

HEALESVILLE	**£4**
WARBURTON	**£3/15/-**
COWES	**£5/10/-**
MOUNT BUFFALO	

See other side.

Write to the Government Tourist Bureau for full particulars.

Victorian Government Tourist Bureau

Queen's Walk, Opposite Town Hall, Melbourne

Full Information supplied in regard to **Excursions, Tourist Resorts, Accommodation, &c.** **Tickets issued daily**

Handbooks, Maps, and Hotel Guides Free on application.

Telephone Nos. 2898 and 2899 Central

GEO. H. SUTTON,
Secretary for Railways.

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